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VOL. I.—4TH YEAR. SYDNEY: SATURDAY, JANUARY 6, 1917. No. 1.

ROMANCE IN MEDICINE.

III.
BACILLI AND IMMUNITY.[1]

By J. C. Verco, M.D. (Lond.), etc.,
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Once upon a time a dire disease ravaged a royal city. It seized chiefly the children, of whom a whole family might die. Some were strangled before their parents' eyes. Little ones sat up in their cots to play, fell back and in a moment were gone. Others apparently recovered, afterwards lost power to move or even breathe, or they became swollen, grew weak and pale, and, lingering long, passed away unconscious.

And the princess in her palace kissed her little sick child in the fullness of her love, and she fell sick and died.

In their sore distress, the custodians of the city sought the mighty magician who lived in the labyrinth near by and consulted him as to what might be the cause and what the cure of their unwonted ills.

He boiled his concoctions, cultivated his samples on their proper soil, polished his wonderful lamp and arranged his marvellous mirrors and tubes; and, gazing into these, they saw the cause. A vegetating fungus, growing and spreading with its myriad spores, from which at myriad points oozed out a fluid of awful potency. This fungus, like the deadly upas tree, destroyed those who came within its baneful influence, its seeds strangled them, its poison paralysed them. The magician pressed a button and a slave appeared, and at his word brought forth a splendid steed. This the magician presented to the custodians of the city, that it might be the Palladium of its Health.

It was no counterfeit and no death-trap of treachery and deceit, like the mock monstrous horse of Troy. Nor was it any common beast, but, by the cunning of magic sorcery, had been made proof against the deadly effects of the foul fungus; its seeds could not strangle him, nor its poison paralyse.

The custodians royally stabled him in the precincts of the Temple of Æsculapius. From his purple veins there flowed, as from a divine spring, a life-saving stream. And whenever any in the city fell sick through the dread influence of the plague fungus, to them was instantly brought a tiny phial from this fountain of blood, the potency of the poison was destroyed, and the little ones were saved; and the city was glad.

This fairy tale, like the two preceding ones, is in allegory just an outline of the lecture that follows. The dire disease is diphtheria, the plague fungus its bacillus, the paralysing poison its toxin, the wonderful steed an immunized horse, which supplies the serum, the phial a dose of antitoxin. Let me further explain and amplify the Romance of the Palladium of Safety in my lecture to-night on Bacilli and Immunity.

As a medical student I was acquainted with diphtheria. Its special sign was a greyish or yellowish patch in an inflamed throat. From this its name was derived; for διφθέρα is the Greek word for a skin or pellicle. It was given by Bretonneau, a famous French physician in 1821, who studied an outbreak of it in Tours, introduced by a regiment of French soldiers. He called it *diphtherie*, which Dr. Farr anglicized into diphtheria. Whenever we looked into an inflamed throat and saw such a patch, we at once thought of diphtheria, and were made anxious, because of its known danger.

We were aware that other sore throats showed patches, and were of a different nature, and ought not to be called diphtheria. There were swollen tonsils, with many small yellowish spots on them. There were ulcerated throats, with small eaten out areas covered with a thin pellicle. There were little grouped herpetic grey patches; and these were often very like the serious disease. Sometimes during an epidemic there would be sore throats, but no visible patches. While they were most probably diphtheritic, from their association, we could not be sure.

You can understand how worried we were about our diagnosis; for not only was the patient's life involved, but questions arose of isolating the patient, forbidding school-going, or closing schools, or even stopping all the business of a house, as in a dairy. We formulated all the diagnostics we could, based upon appearances and attendant symptoms and history, etc., so as to come to a correct decision; but were frequently in doubt and therefore troubled lest on the one hand we should inflict unnecessary loss and inconvenience and distress by isolating when real diphtheria was absent, or, on the other, incur risk of danger and death to many by not isolating when real danger was present; and of necessity we made mistakes both ways. Uncertainty created anxiety.

Besides these local signs in the throat, there were also serious general symptoms, feverishness and prostration, varying greatly in degree in different cases.

We felt sure that diphtheria, like small-pox, for instance, was a specific disease, which affected the system generally and caused the patches in the throat.

Small-pox we knew was due to a specific poison usually breathed in with air. It first entered the general system and there for several days developed and multiplied—incubated, as we say. Then the patient rather suddenly became very ill with fever and pains, and after three days the small-pox spots came out on the skin and perhaps on the throat. These local manifestations were plainly secondary to a general poisoning of the system. We knew also that if

[1] Being a Lecture delivered in the University Extension Course on July 13, 1916.

we took some fluid from a small-pox spot or pustule and inoculated it into a person's arm, he would get a pustule at this spot, like a vaccination spot, and after a definite number of days he would get ill and have a regular attack of small-pox. Here the poison was plainly introduced into the system at the spot inoculated, and the general symptoms were secondary to and caused by this local lesion. In diphtheria we did not know whether the poison was first introduced into the system and caused feverishness and other general symptoms and then caused the patch in the throat, or whether the poison first caused the patch in the throat and through this caused the general symptoms.

We knew also that in a certain proportion of cases very strange nervous symptoms followed, perhaps two or three weeks after recovery. We called them diphtheritic paralysis. The minute muscle inside the eye failed, and near vision was lost, and the patient could not read. Swallowing was difficult from paralysis of the throat; food frequently went the wrong way. Walking might be impossible, the arms might be useless, the respiratory muscles might fail or the heart muscles, and the patient might die of want of breath or of heart failure. Now why these paralyses occurred in diphtheria more than in any other of the infective diseases we did not know, nor what was their immediate cause or their nature, and whether they were due to changes in the nerves; or in the brain or spinal cord, we had no idea.

We knew also that sometimes the disease extended downwards from the throat to the larynx, the part at the top of the windpipe, and caused diphtheritic croup, which was almost invariably fatal. We dreaded to detect the first signs of this complication.

We were also acquainted with a disease which we called true or membranous croup. This began in the larynx, and was also extremely deadly. Sometimes it was epidemic. An examination after death of the inside of the larynx revealed a membrane or pellicle more or less blocking up the free way of the air passage, which could not be distinguished from that found in the same part, when it arose as a complication of diphtheria. We were divided in opinion as to whether this membranous croup was a distinct disease, or whether it was only a form of diphtheria which began in the larynx, instead of in the throat. The balance of evidence was in favour of the unity of the two conditions; for sometimes in the course of a croup one or more patches would begin to form in the throat, when at once it had all the features of a diphtheritic croup. But though we might feel sure they were identical, we could not prove it, and some physicians would not allow it.

Our treatment consisted in soothing the inflamed throat by local applications, in taking away the membranes that formed there, sometimes by very painful procedures, and in cleansing them with antiseptic sprays and gargles when they began to decay. Also in maintaining the general strength during the fever and prostration by food and stimulants and medicines. But our success was not great; from 40% to 60% of our patients died. If suffocation threatened from diphtheritic croup, nothing better than opening the windpipe was known. It gave a temporary relief to the immediate distress; but almost all succumbed. Is it any wonder diphtheria was a terror both to the people and the profession?

To-day all this is changed. And we want to trace the gradual evolution of our present knowledge.

Our first great ground of gratification was the discovery of the diphtheria bacillus. This was found in a piece of membrane by Klebs, who described it in 1883. Shortly afterwards Löffler separated this bacillus by growing it in the laboratory on artificial media. It is called therefore the Klebs-Löffler bacillus, in honour of these two workers.

And what is a bacillus? It is a living organism, something alive. It has been placed in the vegetable kingdom. It is unicellular, composed of one single cell, and so is close to the unicellular *Algae* or seaweeds and unicellular fungi or mushrooms. It is among the lowliest of all living things. It is exceedingly minute. The diphtheria bacillus is generally less than one ten-thousandth of an inch long and one thirty-thousandth of an inch wide, so that, on a penny stamp, about four hundred million of them could lie side by side. They multiply by simple division, the one into two, the two into four, the four into eight, and so on by geometrical progression, at an incredible rate.

Here is our first romance. That our throat should be infested by such minute living beings, should become a vegetable garden for these microscopic organisms, where they can flourish, and in their multiplication can excite a disease, which may prostrate, paralyse, and even destroy. To accept such a statement, does it not demand of ordinary people great faith in biological and pathological science?

But how do we know this bacillus is the cause of diphtheria?

Guinea-pigs and cats have been inoculated with this bacillus, taken from diphtheria membrane. Local conditions just like those in the throat in diphtheria result, and in some cases diphtheritic paralysis has followed.

And of what practical value was the discovery of this bacillus? Immense.

It at once put into our hands an infallible means of deciding whether we were dealing with diphtheria or not. The question could now be settled within a few minutes sometimes, and fairly certainly within 24 or 36 hours. A scraping from a patch in the throat, after being stained with appropriate and well-known reagents, could be examined under the microscope, and the bacilli recognized. If none were visible, a test-tube containing broth or coagulated serum could be inoculated by a needle with material from the membrane, and incubated, *i.e.*, kept at a uniform heat for 24 hours; by this time colonies of the germ would have grown, and by their naked-eye appearance, their action on the medium upon which they were grown, their staining and their characters under the microscope would reveal their nature. If *Bacilli diphtheriae* were seen we knew we were dealing with true diphtheria. Whatever the appearances in the throat might be, the presence of this

bacillus was absolute proof of diphtheria. Now we were sure, and could proceed at once to isolate a patient and take any other steps which might be deemed necessary, however much expense and loss and hardship they might entail.

Further, in earlier times, when a child had been under treatment with patches in the throat, and these had all cleared up, how could we determine its actual freedom from contagion, and that if allowed among other children it would not infect them. We could only judge by the normal appearance of the throat, and sometimes this judgement was wrong. The child was sent home, and a week or two afterwards one or more of its companions developed diphtheria. Now, when the child's throat is quite cleared of all patches, it is swabbed three times, at intervals of about a week, and the material from the swabs is incubated on proper media. If these yield no diphtheria bacilli on three separate examinations, we know that the child is cured and can be certified as non-infecting, and can mingle with the healthy without danger.

So in schools when diphtheria is epidemic, every child complaining of a sore throat of any degree, even though no grey patch is visible, must have its throat examined bacteriologically for the germ, and be certified germ-free before it can be re-admitted to school; if the diphtheria bacillus is found the child must be at once excluded from the school and isolated.

Again, there are what are known as "carriers." They may be patients who have had diphtheria weeks or months before and are apparently quite well. They may be persons who have not been ill, so far as is known, but who have been in contact with diphtheria patients. Wherever these individuals go they carry the disease with them, and unwittingly sow it broadcast. How can they be detected? By finding the bacilli. Some of them yield the germs from a seemingly healthy throat; some of them from their nostrils, even in what appears to be a chronic disease of the nose (*rhinitis fibrinosa* yields abundant virulent diphtheria bacilli); some from a discharging ear. The finding of the germ incriminates them at once.

I remember a child who had diphtheria of the throat. During the course of its illness an earache came on, with discharge. The child was quite well but for the running ear. The discharge gave a pure culture of *bacillus diphtheriae*. For weeks I treated it, syringing it myself with antiseptic lotions made stronger and stronger, until one day I washed out a complete cast of the ear channel, composed of diphtheritic membrane, and the child was free at once. Till then that little girl had been producing untold numbers of bacilli daily, and if allowed to mingle with others might have widely disseminated the disease.

Other sources of infection may be detected in the same way. Sometimes an epidemic can be traced apparently to a milk supply. By examining the milk from different contributing dairies, the offending dairy can be recognized, when perhaps a sick patient or a convalescent, or perhaps a carrier, may be found there; or, if not, an investigation of the milk at that dairy supplied from several cows will fasten the infection upon a particular beast. This is found to be ill, or to have certain sores upon its teats, which yield abundance of virulent bacilli. And the source having been discovered, the epidemic can be stayed.

So again bacteriological examination of the membranes proved conclusively that diphtheritic croup and true or membranous croup were identical, and the difference was only in their site of origin, and that consequently patients with true croup were to be isolated and treated as diphtheritic.

The discovery of the *bacillus diphtheriae* as the cause of the complaint has thus marvellously simplified our work and reduced our worries, and made certain what before could only be a probability or a doubt, and was always an anxiety.

The next discovery of importance was the bacterial toxin, in 1888. Two investigators, Roux and Yersin, cultivated the *bacillus diphtheriae* in a suitable medium, and found that the bacillus produced a sort of poison. This was contained in the broth or other medium in which the germ was grown. If they put the mixture of bacilli and medium into a porcelain filter, the bacilli were kept back and the poison passed through. This poison was called a toxin. But why call this product a poison or toxin? Well, they injected it into susceptible animals, such as rabbits, without, of course, any diphtheria bacilli. These animals were poisoned; they developed feverishness and nervous paralysis of limbs. Now what did this show? Two things quite plainly. First, that these bacilli in their growth and multiplication generate a poison which is called a toxin. Second, that this poison or toxin, quite apart from the bacilli themselves, will cause general symptoms of disease. If this poison enters the system of an animal, even if there be no bacilli in its system, the animal will manifest systemic symptoms.

Dr. Sidney Martin carried the observation a step further. From the blood and viscera of children (not from their throat patches) who had died of diphtheria he separated a poison. This injected into the veins of rabbits gave them fever and loss of weight and strength, and later produced paralysis—just the train of symptoms characteristic of diphtheria. From pure cultures of the Klebs-Löffler bacillus in the laboratory, obtained from the throat patches, he separated a toxin which, when injected into rabbits, was followed by just the same train of symptoms. What did this prove? That the poison found in the tissues of the body in diphtheria was identical with the toxin secreted by the Klebs-Löffler bacillus in a test-tube, and that therefore the Klebs-Löffler bacillus found in the diphtheritic membrane in the throat was the essential cause of diphtheria, and produced its general poison; that the general symptoms of diphtheria were caused by the toxin secreted by this bacillus in the throat membrane. The toxin from the throat enters the system, and the general symptoms are due to the poisoning of the system by this toxin.

Another observation carried us a step further. The mucous membrane of the throat and parts adjacent, and especially the grey patches, swarm with bacilli,

whereas the blood itself and the various organs of the body contain very few. In fact, so few that for some time it was believed there were none. More recent and thorough examinations demonstrate their presence, at least in patients who have died; but such bacilli in the blood and internal organs are so few that they may for practical purposes be ignored. You cannot get toxin without bacilli. From many bacilli you will get much toxin, and from few bacilli you will get but little toxin. Therefore, from the numerous bacilli in the throat abundant toxin will be derived, from the few bacilli in the blood and viscera only scanty toxin, and if there are no bacilli no toxin. Consequently, the general symptoms are not due to bacilli circulating in the blood or located in the internal organs, nor to toxins formed by these; but are due to toxin secreted by those bacilli which are lodged in the mucous membrane in the throat. In the throat patches and in the red and swollen mucous membrane around the poison is produced, and from these places it passes into the circulation, and causes the general symptoms. There is the *fons et origo mali.*

And this permits us to decide another point formerly in dispute. Does the complaint begin as a general affection, like small-pox, in which the patient is ill for days and then gets spots on his skin, or does it begin as a local affection, which later causes the general symptoms? Without a doubt the latter is the case. Bacilli lodge in the throat, and there multiply and form their toxin. While they are few and their toxin is scanty, the patient seems well. When they become numerous and their toxin abundant, this being absorbed into the blood, becomes sufficient to excite feverishness with all its attendant signs and discomforts, and the patient feels ill.

Diphtheria is certainly at first a local disease, and gives rise locally to a poison which is absorbed, and then occasions general phenomena. Just as a person might cut his hand and get it infected with the germ of erysipelas, causing the local disease, and by absorption of the poison get the high fever and all its concomitants and consequences.

The bacilli are in the throat, practically only there. There is the toxin manufactory, and thence it is absorbed into the blood and sets up the systemic symptoms.

Now we must turn our attention to another phase of diphtheria investigation full of interest and fraught with benefit. If a dose of diphtheria toxin is injected into a guinea-pig, the intoxication makes it ill, and if the dose be sufficiently large, the guinea-pig will die; it has had a fatal dose, or, as it is technically called, a lethal dose of toxin. If a smaller dose than this is given, the guinea-pig will recover. Now if, after its recovery, another dose of the same strength is given, it will not be nearly so ill, or may not be ill at all. It has acquired some sort of resisting power against the poison. Technically it has become immune; it has acquired immunity. If a very minute dose be put into a guinea-pig it will cause very slight symptoms, which soon pass away. Another slightly larger dose may now be given with trifling symptoms, and gradually the dose can be increased, until at last one very greatly in excess of a lethal dose may be given without any noticeable effect. This guinea-pig will receive with impunity a dose large enough to kill two ordinary guinea-pigs.

Now what has happened? The guinea-pig's blood has undergone a change, so that a dose of poison which ought to kill does no harm. How can we explain this? Well, the most natural solution is that an antidote to the poison has been generated in the guinea-pig's blood, and circulated in it, so, when a dose of poison is introduced, this antidote neutralizes it and renders it harmless. The toxin has caused the creation of an antitoxin, potent to counteract it.

Suppose this to be the case. If some toxin were taken and mixed with a certain quantity of blood from an immunized guinea-pig containing the antitoxin and the toxin and antitoxin together were injected into a healthy guinea-pig, it ought not to get diphtheria, nor will it. The antitoxin has neutralized the toxin. Again, if some blood containing this antitoxin were injected into a healthy guinea-pig, and then, after a while, some toxin injected into it. What ought to happen? Nothing. The guinea-pig ought to go on munching its orange peel, etc., and not die of diphtheria, nor will it. The antitoxin first injected will neutralize the toxin when injected later. If toxin were injected into a guinea-pig and it were allowed to get the signs of diphtheria, how would it do at this stage to inject some blood containing antitoxin? Might it catch up the toxin and neutralize it and stop the diphtheria? It might. It ought to theoretically, and it actually does; and so a guinea-pig which has received a lethal dose of toxin may be saved from death by a dose of antitoxin. And this further fact has been proved, the sooner the antitoxin injection follows the injection of the toxin the more certain it is to save the guinea-pig and the smaller is the dose of antitoxin required; the longer the interval the larger the counteracting dose must be. As an indication of the influence of this time element, let me say that if the antitoxin is not used until eleven hours after the toxin is injected, 5,000 times as much antitoxin is required as if the injection of the two had been simultaneous. If the interval should be very long, no dose of antitoxin, however large, will be sufficient; the guinea-pig will die. Of course, the smaller the infecting dose of toxin used, the smaller need be the dose of counteracting antitoxin.

Now von Behring, who published his remarkable discoveries about these antitoxins in 1890, also found out that a single dose of toxin injected into an animal only produced a weak antitoxin in its blood, a second larger dose produced a stronger antitoxin, a third still larger dose a still stronger antitoxin; in fact, that, by repeated injections of gradually increasing quantities of toxin into an animal, he could make its blood progressively more and more potent with its antitoxin, so that very little of it would be necessary to counteract even a lethal dose of toxin in another animal.

Now we may ask a very practical and important question.

What part of the blood contains this antitoxin? Not the red corpuscles alone, nor the white, nor the fibrin, which all together set solid and form the

clot, not the solid parts of the blood, but the serum, the fluid part, which oozes out of the clot and collects around it, and can easily be injected with a syringe through a fine needle. Is not this a fortunate circumstance and a great convenience?

Now see the immense value of these observations. If guinea-pig antitoxin injected into guinea-pigs will prevent or cure diphtheria in them, why should not a human antitoxin injected into humans prevent or cure diphtheria in them? Doubtless it would. And if it were possible experimentally to give a man repeated doses of diphtheria toxin, and work up the antitoxin content of his blood, and then take his blood, and use it on other people for their cure, it would doubtless be effective. But how many of you would be prepared to be worked up for the purpose of supplying antitoxin serum for the sick. That is out of the question then.

Is it not possible that guinea-pig's blood would be as effective in children with diphtheria as in guinea-pigs? It is the same bacillus, the same toxin, very similar blood, the antitoxin must be very similar. It ought to act.

But then guinea-pigs are so small and can supply so little serum. So many guinea-pigs would have to be treated. How would sheep do? Better! Or cows do? Better still. And the horse? Best of all. He is the ideal animal. He is so large, he can take large doses of toxin without showing any discomfort, and will furnish large supplies of immunized serum, and so this noble animal is used. A young horse is taken and carefully examined and certified free from all equine disease. Diphtheria bacilli from a throat are cultivated by being introduced into a vessel of broth and incubated at a suitable temperature. This culture is passed through a porcelain filter, so that only the toxin in solution, free from all bacilli, is obtained. A very small quantity of this (a quarter of a cubic centimetre) is injected into the horse. Its temperature may rise a degree or so for about six or eight hours. In three days he has another dose of the same value. At the end of a week a dose four times as large (a cubic centimetre) is used, and repeated three times during the second week. During the third week he has three doses, each five times as large (each 5 c.cm.), and then the dose is raised so that at the end of six weeks he is getting, three times a week, 400 times as much as at first (100 c.cm.).

When he is properly immunized he is bled. To keep him quiet he is given a turnip or a carrot to eat. From a vein in his neck about one to three gallons of blood are taken under strict antiseptic precautions, set aside on ice until all the serum has separated; this is run into sterilized bottles, closed with sterilized corks and sealed. To ensure the absence of sepsis—that the blood serum is free from all germs of disease of any kind—a sample is put into a tube and placed in an incubator for 24 hours, and if no bacterial growth occurs it is proved to be aseptic, and can be safely used.

Now its strength has to be tested, and this is shown by the quantity of this serum necessary to neutralize a dose of toxin which will kill a guinea-pig of a given weight in 24 hours, and this is the standard unit of strength.

But is it not cruel to the horse? Not at all. He does not seem to mind it. Dr. Ruffer says he has a horse which has received three and a half pints of toxin, and has been bled five times, yielding altogether about 90 pints of blood, and was then in better condition than when he was bought. And though he had immunized twenty horses he had never seen one show any serious symptoms. So the horse has been used, he has been immunized, his serum has been injected, and the results have been eminently satisfactory.

Directly a patient is seen with a sore throat suggestive of diphtheria, a swab can be taken and sent to the laboratory for urgent bacteriological examination and an injection of antitoxin given at once. But you may say why not wait until the result of the bacteriological investigation has been reported? Then if positive the antitoxin could be administered, if negative it could be withheld! Why not? Because the time element is of such importance. Did we not see that, in guinea-pigs, if eleven hours elapsed after injecting the toxin before injecting the antitoxin, 5,000 times as large a dose must be given to produce an equal effect. So a loss of 36 hours in using immunizing serum in a patient may mean loss of his life. Besides, a dose of antitoxin in a patient not suffering from diphtheria has no eventual ill-effect, even though it may occasion some temporary discomfort.

Here is a table to impress the importance of as early a use as possible of the antitoxin. In cases where it was given on the first day of the disease no patient died, on the second 4.3% of those treated, on the third 11.03%, on the fourth, 15.2%, on the fifth 19.9%, that is, nearly 20% died who were left until the fifth day, and none who were treated on the first day, and more than 4½ times as many died as among those who were treated on the second day. And of 460 cases among doctors, nurses and employees in hospitals, etc., not one died, because they received large doses at the onset of their complaint.

And what has been the result of its employment? A marvellous reduction in the death-rate. From over 40% to less than 8% in some places. So that four out of five of those who without it would have died are now saved. Perhaps we scarcely grasp, at first, what this really means in the saving of life. It has been estimated that in London alone the lives of more than a thousand children are saved every year by the use of diphtheria antitoxic serum. In South Australia during 1912 and 1913 sixty-five children died of diphtheria. But for the use of antitoxin our mortality might have been 325. so that 260 lives, 130 a year, have been saved to the State.

The benefit derived from the injection of antitoxin for the cure of diphtheria has been most gratifying. It can also be used for preventing the disease; when injected, it circulates in the blood and protects against the deleterious influence of toxin formed by bacilli which may have established themselves in the throat, and so may prevent all general symptoms; and it may even prevent them from establishing themselves there, if they have happened

to fall upon and adhere to the throat. But the antitoxin does not circulate very long, and is rather rapidly eliminated as a substance foreign to the system, so that, within about a fortnight, from the time of its introduction, it is inert. Hence, if a child is in contact with one or more diphtheria patients, it is wise to give it a full dose of antitoxin as a preventive; but it will need another within a fortnight, if it continues to be in contact with infective patients.

Immunized serum has been used not in diphtheria alone. It has been used just in the same manner and upon the same principles in that frightful and fatal disease, lock-jaw or tetanus.

Its beneficial results in diphtheria, however, have proved far more beneficial than in lock-jaw, and have saved far more lives, both absolutely and relatively, *i.e.*, not only in actual number of patients rescued from death, but also proportionately to the number attacked. Still, tetanus antitoxin is in considerable favour. Among the soldiers wounded in Northern France during the present war, lock-jaw was very prevalent in the earlier months, so much so that it became the rule in some hospitals to anticipate it and give every wounded soldier an injection of serum, so as to prevent its occurrence. In a recent issue of the *British Medical Journal* (January 2, 1915, p. 45), in a communication from Dr. Hartmann, to Académie de Médecine, stating that among 3,300 wounded received at two French Hospitals with 43 cases of lock-jaw, not one case occurred among men who had received injections of antitetanus serum, he expressed the opinion that every wounded man brought in, with lock-jaw or without, should have an injection at once, to be repeated in a week's time. Happily, the frequency of this deadly complication is now considerably reduced among our brave allies.

Now perhaps you may say: This wonderful and life-saving discovery in reference to diphtheria antitoxin has doubtless been extended not only to tetanus but to all the other bacillary and bacterial diseases, and has proved of equal value in them. Well, no; and this has been our experience in many other instances, we cannot make these great generalizations; we think the bacilli will all act alike, but they do not. There are but few bacilli which excrete this toxin in appreciable quantities. The others do not. These two live, as we have seen, on the surface; in the throat or in a wound, not in the blood and tissues. The others live in the blood or in the tissues. Those two excrete their toxins, and the toxins soak into the blood, while the bacilli remain outside. The others keep their toxins within themselves as endotoxins, as they are termed, and have themselves to live in the blood and tissues in order to do harm. There their toxins gradually excite in the patient's system the production of antibodies, which neutralize the toxins and kill the bacilli, and hence the patients gradually get well. And so, in order to prevent these other bacillary diseases, we have to proceed on a different plan altogether.

Let us take typhoid fever, for instance. This is due to the *bacillus typhosus*. But the *bacillus typhosus*, when cultivated, does not excrete a toxin into the broth in which it grows; its toxin is locked up in its own body. And to get any benefit from its use, not only the broth, but all the bacilli that swarm in it, must be employed. But you will say, "Surely if this were injected into a man it would give him a most virulent and fatal attack of typhoid." It certainly would. The living bacilli would multiply in his tissues. Then they must be killed. Yes, killed by heat. When thus killed, the patient receives an injection of 500,000,000 dead bacteria, and ten days after a thousand million more, and a third one of a thousand million, 2,500,000,000 altogether.

These are not called antitoxins, but antigens—substances which generate antis—and they do not act like antitoxins; they do not neutralize any toxins, but they excite in the person's blood the production of substances called antibodies. These antibodies are antagonistic to the bacilli, and lead to their destruction. And they effect that destruction in two ways. Some of the antibodies are lysins, or solvents, as we might term them, in that they have the power of dissolving the bacteria, killing them and causing them to vanish away. And other of the antibodies are opsonins, which attach themselves to the bacilli, and alter them or prepare them in some way, so that the white corpuscles in the blood, phagocytes as they are called, can seize on them and devour them, and digest them, and completely dispose of them; which they could not do were these opsonin antibodies not present. Suppose now that a person who has been thus inoculated with dead typhoid bacilli, and in whose system these antibodies have been generated, should get a dose of living typhoid bacilli into his blood or tissues, these antibodies will, as lysins, dissolve them, or, as opsonins, will prepare them for consumption by the white cells, and they will in one of these two ways be destroyed before they have had a chance of setting up an attack of typhoid fever.

This is the theory and the rationale of the antityphoid inoculation, as pretty and as interesting as the antitoxin theory of diphtheria, though altogether different and distinct.

This prophylactic or preventive measure is efficacious for two years and perhaps for three.

Its value has been convincingly demonstrated; an antityphoid committee appointed by the Army Council worked at the question for about five years (from 1904 till 1909). Nearly 20,000 soldiers were inoculated against typhoid fever, and rather less were not. The statistics were compiled with very great care, for the special purpose of determining the value of inoculation. They showed that, among the inoculated, there were nearly 5½ cases per 1,000, among the uninoculated there were nearly 30½, that is, between five and six times as many. Had none of the 20,000 been inoculated, 608 men would have been invalided by it, whereas had all been inoculated only 107 would have sickened, a difference of 500 men off duty for about three months. Towards the end of the five years not only had the officers been convinced of its protective power, but the soldiers as well, so that in some of the military units every man had been voluntarily inoculated. During the present war, out of 421 men with typhoid

fever, 35 died, or one-half the rate before inoculation was introduced. Of these 421 cases, 305 were uninoculated men and 116 inoculated. Of the 305 uninoculated men, 30 died (more than 10%), and of the 116 inoculated men only one died (less than 1%), and he had only been inoculated once, instead of the regulation two or three times. It is reckoned that the mortality in the army from typhoid fever has been reduced since the introduction of inoculation to one-fiftieth of what it was before. And as with typhoid fever, so with various other complaints, and with many quite distinct from the so-called infectious fevers. Individuals are liable to be invaded by bacterial germs, which cause affections of various organs or various tissues of their body, and these affections may last for weeks, or months, or years, causing an almost intolerable distress. But if from their own blood, or from some of the eruptions on their skin, etc., the particular germ is taken and cultivated, and from this culture a vaccine is made, similar to that used in typhoid fever, and they receive so many millions of their own dead bacteria by inoculation, the necessary antibodies may be developed in their system, the living bacteria in their blood or tissues may be killed off, and they may be cured of their long-standing complaints.

But time will not permit us to pursue this enquiry further.

Had I been able during this course of extension lectures to show you in detailed sequence the mass of observations and lead you through the winding maze of intricate theories by which these general results, laid before you in outline merely, have been arrived at, the fascination of our enquiry would have been incalculably increased. But it could not be.

How fearfully and wonderfully are we made; what a marvellous mechanism is our physical frame; bone, muscle, vessels, nerves and glands, composed of millions and millions of living cells, how many and potent fluids circulate through and bathe them all. What strange and varied functions, what interaction and interdependence. How smoothly and unconsciously does all proceed when everything is right. What a disturbance in every part when anything goes wrong. One single internal secretion is lacking, and the whole economy is deranged.

How passing strange that the smallest and lowest of animal forms should fix themselves as parasites in the very life-stream of the noblest creation in the animal kingdom, and microscopic though they be, or ultra-microscopic even, they can completely incapacitate him and finally compass his destruction.

How much more marvellous—if this be possible—that the most insignificant and primitive vegetable organisms, consisting of but a single cell, should find his tissues a suitable nidus, should invade his economy, proliferate with an inconceivable rapidity, and instil their poison into his system, so intense and so abundant, that, within a few hours, the strong man may be dead.

How wonderful the capacity of the human mind, to study these physical derangements laboriously, and to trace them back to their hidden and invisible causes, by a combination of careful observation and consecutive reasoning, till they stand manifestly revealed; and then, by a further process of imagination and experiment, to work out their prevention and their cure. Surely it needs no further argument to prove the desirability of establishing laboratories, where alone such researches can possibly be carried on; or the wisdom of supporting scientific men who possess the instincts which make them willing, the attainments which make them capable, the apparatus and the time which will make it possible for them to conduct such researches. That government is essentially utilitarian and the individual a true philanthropist that founds and endows such practical institutions for such practical purposes.

When we reflect upon the saving of human life and the lessening of human misery from the use of these preventive and curative sera, we must have a curiously distorted mental vision to see a crime in the use of sparrows and sheep for the discovery of such remedial measures. The children saved by diphtheria antitoxin alone, thousands and tens of thousands every year, must far outnumber—even as units—all the animals ever employed by experimenters in working out the saving process. And how much is a man better than a sheep, and the children, are they not of more value than many sparrows?

Surely medical men may be forgiven a measure of gratification and pride as they review the beneficent results of their labours in these fields of biology and pathology, and may be permitted a cheerful optimism, and even a glowing confidence, as they predict still greater triumphs in the future over the many ills that flesh is heir to. If we can but prevent the deteriorating and degenerating influences of our civilization from counteracting and counterbalancing the widening range and growing power of our science and our art, mankind may look forward to more rapidly multiplying millions, with longer lives, healthier bodies, sounder minds, and happier hours, though you and I (as Tyndall has said), "like streaks of morning cloud, have melted into the infinite azure of the past."

Reports of Cases.

FATAL HÆMORRHAGIC DENGUE.

By **J. Albert Goldsmid, M.B. (Syd.),**
Murwillumbah, New South Wales.

In a previous communication on the subject of dengue by Dr. Crosse and myself stress was laid on the rarity of complications. Further experience has shown that jaundice of a moderately severe type is not uncommon, and, in addition to this, I have seen three severe cases of purpuric complications.

Two of the three were in children whom I saw for Dr. Cross. These children, aged three and five years respectively, developed the disease in the country during the wet weather. The swollen creeks prevented the parents from bringing them to town, and made it impossible to get into telephonic communication with a doctor. When seen, both children had been ill for five days. They had hæmatemesis and hæmorrhage from the bowels. The three-year-old boy was moribund when brought in, and died within 24 hours. The girl recovered after a tedious illness, with frequent relapses of her fever, though when once thoroughly checked the hæmorrhages did not recur. The third case was sufficiently remarkable to be recorded at length.

Thomas M., aged 26 years, a farm labourer, came in on May 25, 1916, on account of hæmorrhagic effusions into the tongue, hands, wrists and forearms. The legs and body were also affected.

Previous Illnesses.—The patient had had malaria in Northern Queensland two or three years before. He had taken large quantities of quinine in his time. There was no history of hæmophilia in the family.

Present Illness.—Dengue had been present in the household of his employer, and on May 17, 1916, he became ill with pains in the back and limbs, headache and soreness of the eyes on movement. He had slight fever, but did not notice any rash. The condition was evidently dengue.

On May 23, 1916, he was back at work, and noticed that some slight scratches bled very freely and persistently. He had never had anything of the kind before. After a time, small, very dark spots came out on the hands and spread all over the body. Some of the spots became large, and his gums began to bleed. There was no vomiting and no purging. He was "light-headed" for one night. He passed bloody urine. He had taken no drugs except a dose of magnesium sulphate.

Present Condition.—The temperature was 98.6° F. and the pulse-rate 84. Hæmorrhages were present on the upper lip and tongue. On the latter three large petechiæ were present, one of which was raised. Small petechiæ were visible on the gums and palate, and blood was oozing round the teeth. The throat was reddened, but no hæmorrhages were seen. Small petechiæ, varying in size from a millet seed to a split pea were present on both hands, both wrists and both forearms, and a few were seen on the right upper arm. On the back, just to the left of the lumbar spines, were three large effusions, and a fine hæmorrhagic rash was present on the buttocks, abdomen, inner surface of both thighs and on both legs, especially on their outer surfaces. This rash gave a close flea-bitten appearance. In addition, the legs showed hæmorrhages varying in size from a millet seed to a split pea. The palms and soles were clean, except for a faint rash on the right palm.

The urine was of a bright claret-colour, was acid, and on microscopical examination was found to contain red blood corpuscles.

On May 26 the urine contained much more blood. The patient was spitting blood from his mouth continually. There was no change on the following day in the patient's condition. The pulse-rate was 50 and the temperature was 97° F. Blood was passed from the rectum after an enema. At 8 a.m. on the 28th hæmorrhage from the nose occurred. The patient vomited blood, and also coughed it up. He complained of pain in his head. The petechiæ on the hands were much larger.

At 9.15 a.m. he was unconscious, and at 1.45 p.m. he died.

A post mortem examination was carried out two hours after death.

In addition to the skin petechiæ already described, a considerable subcutaneous hæmorrhage was present in the left epigastric region, where coagulose had been injected.

The blood showed no tendency to coagulate, and was magenta coloured. The brain was pinker than usual. Small effusions of blood were detected under the pia mater, about the middle of the longitudinal fissure in each hemisphere, and a considerable one under the pia in the right temporal region. Both lateral as well as third and fourth ventricles were full of blood.

The heart was empty and contracted. A hæmorrhage was found under the endocardium of the left ventricle, extending to the base of the mitral valve.

In the lungs there were petechiæ everywhere. Considerable sized hæmorrhages were present at both bases and in the posterior regions.

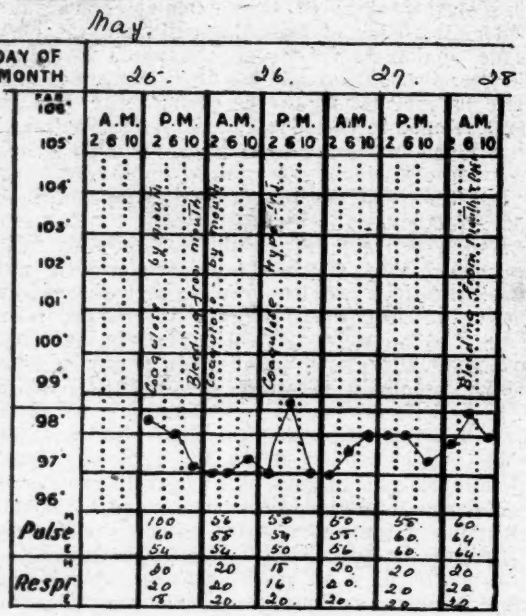
The mucous membrane of the stomach was covered with small hæmorrhages. In the small intestines only a few slight bright-coloured spots were noted under the serous coat. Large sub-mucous hæmorrhages were found in the descending colon.

Numerous small sub-mucous hæmorrhages were situated in the urinary bladder. In the kidneys the peri-renal tissue was infiltrated with blood. The calices and renal pelvis contained hæmorrhages, and the lower part of the cortex showed red striæ.

The liver and spleen were normal.

The condition recorded above points to a profound alteration of the composition of the blood, which oozed through the vessels everywhere and caused death by raising the pressure in the lateral ventricles. The headache complained of at 8 a.m. on May 28, 1916, was probably caused in the same way. Drugs did not seem to have the slightest influence on the condition. The blood was examined for malaria parasites both by me and in the Bureau of Microbiology. None were found. Specimens of the kidney, liver and spleen were sent to the Bureau of Microbiology in Sydney, and the following report was made by Dr. Cleland:—

> Spleen.—The Malpighian bodies were prominent and the sustentacular cells were much in evidence. There was a small hæmorrhage in one part. In many of the cells there was a number of irregular, dark, yellowish-brown pigment granules (altered blood).
>
> Kidney.—In many of the epithelial cells there were a few dark, yellow-brown pigment granules.
>
> Liver.—Many of the liver cells contained numerous small, dark, yellow-brown pigment granules. These granules were also seen in the supporting connective tissue cells.



The patient was obviously suffering from a purpuric condition with hæmaturia. It would be important to ascertain whether this condition was definitely associated with an attack of dengue in a patient with a history of malaria, as there was apparently no direct proof of connexion with malaria itself. It may, of course, have been a case of "idiopathic purpura," but I understand that cases of purpura have been met with occasionally during the recent dengue outbreak.

To this I have only to add that, in view of the contention that dengue is supposed to be an attenuated form of yellow fever, these cases are worthy of careful study, especially when the occurrence of jaundice is taken into account. There is also the fact that the disease is transmitted by *Stegomyia fasciata.*

A CASE OF EPITHELIOMA ADENOIDES CYSTICUM (BROOKE).

By **Norman Paul, M.B., Ch.M.,**
Honorary Assistant Dermatologist, Sydney Hospital.

This is a rare benign and nævoid condition, which may manifest itself in several generations. The patient, M.T., is a female, æt. 37, and in her case this hereditary tendency is in evidence, as the father and grandfather were slightly

affected. Of the present family of three males and four females, the eldest and youngest of each present a similar condition. The eruption varies in intensity; in one case there are only a few lesions, whilst it is most marked in the patient and a brother, who show a similar distribution. Those members exhibiting the disease have features resembling their father; but signs are absent in those resembling their mother. In every case the condition started about puberty. The patient states that the lesions have been gradually increasing in number, and when erupting are slightly painful. On examination, a symmetrical eruption is observed to be situated about the inner canthi of the eyes, extending along the naso-facial folds, and then

Epithelioma Adenoides Cysticum (Brooke).

thickly to the outer margin of the mouth, whilst the intermediate portion of the lip is also affected. There are some scattered lesions on the chin, and papules are aggregated in front of the ears, around the outer canthi of the eyes and extending from the inner canthi of the eyes to the adjacent part of the forehead. The lesions are firm to the touch, and vary from millet-seed sized to papules a little smaller than hemp-seed. In colour they are somewhat more translucent than the normal skin, and a few show dilated capillaries. In none of these cases has there been any tendency to breaking-down of the lesions. The present case I propose to treat with radium.

Reviews.

DISSEMINATED SCLEROSIS.

Disseminated sclerosis, as its name indicates, is characterized by the distribution of irregular sclerotic patches throughout the nervous system. Its manifestations, therefore, are protean, and an exact knowledge of its anatomy is essential to an understanding of its numerous clinical forms.

Charcot's original pictures of the condition are classical, and all subsequent studies have been influenced by his fundamental observations, and on the three cardinal points emphasized by him, proliferation of glia, degeneration of nerve fibres, and blood-vessel changes, the various hypotheses put forward to explain the disease have been centred.

In spite of much research, the ætiology of the disease remains quite obscure. The supposition of a selective poison, acting through the blood-vessels, which has received the support of the majority of recent investigators, is justified as an hypothesis, but continues undemonstrated as a fact.

The pathological process may be disseminated through brain, pons, medulla and cord, and may produce symptoms of a very diverse character. According to the predominance of different symptoms, the disease has been divided clinically into various types, but probably no cases are purely of one type, and experience has shown that if sufficiently careful search be made, sclerotic areas will be found in nearly all cases distributed through both brain and cord. As far as we know from the findings in other organs of the body, there is no widespread reaction to the ætiological factor, such as is found in anterior poliomyelitis. The anatomical findings point to a process localized in the central nervous system; they bear no analogy to any other known pathological process in the body; we are acquainted with no process in other organs in which the relative integrity of the specific functioning parenchymatous tissue is associated with the enormous increase of the interstitial tissue, occurring in definite circumscribed areas, and, as yet, experiment has thrown little light on this question.

Broadly speaking, two views have been advanced to explain the nature of the process, (1) that the sclerotic areas are the result of some irritant which is distributed through the nerve centres by the blood-vessels, (2) that the disease is due to some developmental or congenital defect of the neuroglial tissue, which renders it liable to irritation. These views may be denoted as the exogenous and the endogenous. The former ascribes to disseminated sclerosis an inflammatory process as its basis. The latter looks upon disseminated sclerosis as a disease independent of external factors, except as *agents provocateurs*.

Concerning the origin of the process, views are no less divergent. Supporters of the endogenous theory naturally see its origin in the neuroglia, while supporters of the inflammatory theory have widely divided views, related to the three separate structural elements, the myelin sheath of the nerve fibres, the glia and the blood-vessels.

Not long before his death Dr. Alexander Bruce, of Edinburgh, had entered upon a study of this disease, and, in collaboration with Dr. James W. Dawson (Neurological Histologist to the Royal College of Physicians Laboratory, Edinburgh), had made a preliminary communication to the Pathological Society of Great Britain and Ireland. The investigation interrupted by Dr. Bruce's lamented death was continued and completed by Dr. Dawson, and now appears in the form of an elaborate paper of over 200 pages, with 34 beautiful plates, some coloured,[1] published by aid of grants from the Carnegie Trust. The study is based on the examination of nine cases of disseminated sclerosis, and its chief object has been to trace by means of the most recent available specific staining methods the characteristics of the pathological process, and to determine, as far as possible, the histological changes which form its basis. The result is a most praiseworthy production, in which all that is known of the histology of the disease is set down in minute detail, and in which views on pathological physiology, pathogenesis and ætiology are modestly but firmly stated, and the findings of others fully but temperately criticized.

In the evolution of an area of sclerosis, Dr. Dawson thinks that the sequence in the pathological process is (1) a commencing degeneration of the myelin sheath and a simultaneous reaction of the glia in the immediately peri-vascular tissue; (2) an increasing glia cell proliferation and a commencing fat granule cell formation; (3) a stage of so-called "fat granule cell myelitis"; (4) a commencing glia fibril formation; (5) an advancing and (6) a complete sclerosis. This is a brief statement of his case, and on the grounds of the nature of its evolution, that acutely inflamed areas are rarely present, and that in subacute processes the general architecture of the tissue is retained, he concludes that the process underlying disseminated sclerosis is a subacute disseminated encephalo-myelitis, which terminates in disseminated areas of actual and complete sclerosis. He thus combats the view that the patches arise out of a developmental process.

[1] The Histology of Disseminated Sclerosis, by James W. Dawson, M.D., Transactions of the Royal Society of Edinburgh, Vol. L., Part III., 1916. Edinburgh: Robert Grant & Son; Fisp. 8vo., pp. 223, with 33 plates. Price, 27s.

There is much to favour the view that true disseminated sclerosis is due to a specific morbid agent, which calls forth a clearly-defined clinical and anatomical picture, and that disseminated affections of the central nervous system, such as disseminated arterio-sclerotic, syphilitic endarteritic and acute encephalo-myelitic processes may all produce a symptom-complex very similar to that of disseminated sclerosis, but they differ in their further course in not showing the characteristic relapses and remissions. Although the causal agent is probably of the nature of a soluble toxin, and may be conveyed to the nervous tissues by the blood channels, it is impossible in the present state of our knowledge to determine its nature, and equally impossible to determine the factor which allows of its diffusion through certain terminal areas of the ramifications of a blood-vessel. Dr. Dawson can merely suggest that the restriction and distribution of the pathological process is in some way related to the selective action of the toxin on certain areas of the blood supply, or that unknown factors determine an irregularly distributed paralytic dilatation, with an increased filtration through the vessel walls.

Concerning the remissions which characterize disseminated sclerosis, there is no known association of the disease with any changes in the gastro-intestinal tract or elsewhere; the connexion, if any, with glands of internal secretion has never been worked out, and the cerebro-spinal fluid is known not to exhibit the cytological and bio-chemical changes which are evident in so-called parasyphilitic affections. Therefore these remissions necessitate the assumption of the latent presence of the morbid agent in the body, or if this is an autogenous toxin, either its intermittent evolution, or its accumulation from deficient elimination.

Turning to the conclusions based on definite histological data, Dr. Dawson holds that sites of predilection are probably related (1) to the blood-vessels, to the terminal ramifications of end arteries, *e.g.*, on the ventricular surfaces, and to the points where vessels break up, *e.g.*, in the transition zone between white and grey matter, and (2) to areas where much glia is normally present; again, therefore, to the periventricular and pericanalicular tissue, to the optic chiasma, to the postero-median and para-median septa, to the marginal glia zone and to the peri-vascular glia layer. The frequent marked symmetry of the areas may be related to both of these circumstances.

It used to be denied that the cerebral cortex was affected in disseminated sclerosis; but this has been proved to be an error. Patches do occur there, and the essential change is a demyelination. The glia cells in the inner more than in the outer layers are proliferated, and just as the anterior cornual cells of the spinal cord persist, even in advanced sclerosis, so also the cyto-architecture of the cortex is frequently retained. That the changes in the cortex account for the mental symptoms often so marked a feature in the clinical picture is doubtful, because cases without discoverable cortical change have presented these symptoms.

The well-known fact of the persistence of numerous axis cylinders in the sclerotic areas is still held to explain the absence of secondary degeneration, the remission of symptoms and the intention tremor.

Dr. Dawson emphatically pronounces the change in the myelin sheath to be the most constant and in many cases the primary one, saying that it has all the characters of a primary degeneration in contrast with a secondary degeneration, and thinking it is due to the destructive or irritant action of the stimulus. He also affirms that the glia changes set in, as a rule, simultaneously with those in the myelin sheath, and correspond to the age of the process and its intensity; at first glia cell proliferation, with the formation of large protoplasmic, potential fibril-forming cells, and, later, glia fibril formation at the expense of the protoplasm. Glia cells which have produced fibrils undergo slow, regressive changes, the glia nuclei subsequently atrophy and disappear, and to such a disappearance is due the fact that the old sclerotic areas have fewer nuclei than the normal tissue. The direction of the glia fibrils is usually that of the normal longitudinal bundles of nerve fibres, but whorls are found or a dense tangle with very fine meshes. The *glia limitans perivascularis* is the first to show signs of reaction.

The topographical relation of the areas points plainly to the blood-vessels or their lymphatic sheaths as the route by which the noxa is conveyed to the tissues, and serial sections show that it is the branches of one vessel stem which are affected. In its diffusion through the vessel wall the morbid agent causes no primary alteration, but ultimately changes arise in the vessels, such as are found in all chronic conditions.

The first fat granule cells are believed to arise from the proliferation of the small round glia cells, and at a later stage, also from a proliferation of the endothelial elements of the adventitia. They absorb the degenerated myelin, which is precipitated as granules in their substance, and finally they pass into the lymphatic sheaths of vessels and are broken up.

The cranial and spinal nerve roots are frequently affected in the glious portion of their extramedullary course, which may account for the slight but ever-present sensory disorder.

Approximately final answers can, therefore, be given to the questions relating to the nature of the process underlying disseminated sclerosis, to its origin, to the relation of several secondary ætiological factors, and to certain aspects of the mode of action of the final causal agent. We are, however, still quite in the dark concerning the nature of this final cause, which determines, anatomically, a process so well defined, and one without any close analogy; and, clinically, a disease which, however variable the early symptoms, conceals its characteristic course only temporarily. The frequent presence of the cardinal symptoms, in spite of the seeming irregularity and incidence in the position of the areas and their restriction, seems to point to a certain constancy in the changes, the nature of which is not yet fully known, but which may be dependent upon a specific metabolic disturbance, due to a latent organism or an autotoxin. All that is most important, therefore, still remains for future investigations along bacteriological, serological and experimental lines, which have recently done so much to clear up the ætiology of other affections of the central nervous system.

Naval and Military.

Two double lists of casualties have been issued since we went to press last week. In the 259th and 260th combined lists the official record of the death of Captain Roger Forrest Hughes is published.

We are pleased to note Captains J. T. Jones and C. J. Tozer have returned to duty.

Among the recipients of New Year honours are the following members of the Australian Army Medical Corps:—

Companion of St. Michael and St. George.

Lieutenant-Colonel Alfred Sutton.

Distinguished Service Order.

Lieutenant-Colonel George W. Barber.
Lieutenant-Colonel Charles H. W. Hardy, V.D.
Lieutenant-Colonel John H. Phipps.
Lieutenant-Colonel Thomas G. Ross.
Lieutenant-Colonel Charles G. Shaw.
Lieutenant-Colonel John V. St. Vincent Welch.
Major Joseph Espie Dods.
Major Alexander H. Marks.
Major Henry K. Fry.

Military Cross.

Captain James Bentley.
Captain John B. Birch.
Captain Arthur E. Colvin.
Captain Eric M. Fisher.
Captain John T. Jones.
Captain James E. Savage.

We learn from another source that Captain James Sprent of Hobart has also been decorated with the Military Cross for gallantry and devotion to duty in August and September, 1916, near Pozières and Mouquet Farm.

We wish to tender our sincere congratulations and to express our gratifications to our colleagues, and to express our gratification on the recognition of their valuable services performed in the face of great danger.

The Medical Journal of Australia.

SATURDAY, JANUARY 6, 1917.

A Year's Work.

A year of supreme moment to the Empire has ended, and the conflicting emotions, hopes and beliefs are continued into the new year. Disappointments have been mingled with gratification. The British Army has asserted itself and the enemy has learned that Britain is a power to be reckoned with, not only on the seas, but also on land. The Commonwealth Forces have given a magnificent account of themselves, but, alas! many have fallen, and many have sustained severe and permanent injury. While our brave sons have faced death and danger with an indomitable spirit, the people of Australia have determined against a scheme for the adequate reinforcement of our units. At the moment, hopes are pinned on the new recruiting campaign, whereby men may be persuaded to do their duty without compulsion. We look back to a time when the enemy was first held in check and then pressed back, when organized concentration made him realize the deadly accuracy of our artillery and the irresistible nature of our advance; when the ingenuity of our chemists, engineers, physiologists and mechanicians brought fresh possibilities into the field; and when a demand for peace indicated the cost to the enemy of the most violent upheaval the world has ever witnessed. During this time the medical profession in Australia has been unable to add much to knowledge, and the record for 1916 is largely one of duty accomplished without any marked advance having been registered.

Naval and Military.

The Defence Department recognized the need for reorganization of the Naval Medical Service, and with this end in view the services of the Fleet-Surgeon have been secured. The work has proceeded steadily and satisfactorily, and is now approaching the completion of its first chapter. A general scheme has been drawn up, and will be announced within a short time. Members of the medical profession will find that the conditions of Naval Service will be more acceptable than formerly, and greater inducements will be held out to practitioners to offer themselves for duty afloat.

The organization of the Australian Army Medical Corps has undergone but few changes during the year; but it may be said that experience, the best of all masters, has effected gradual improvements and smoother working. Various alterations in the personnel of the staffs, both at home and abroad, have been followed by a greater confidence being placed in the Service by the rank and file of the profession. The most important event was the issuing by the Director-General of Medical Services of a memorandum aiming at the better organization of the medical profession at a time when it was anticipated that the provisions of the Defence Act would be extended to service abroad. District Medical Committees were appointed for this purpose, and preparations for keeping the Medical Corps abreast the requirements of our Army were completed. Unhappily, the result of the Referendum compelled the authorities to withdraw the proclamation, and, in consequence, the District Medical Committees passed automatically out of existence. Subsequently an unofficial movement has been started, largely by the members of the Northern Suburbs Medical Association (New South Wales) to carry out the programme of organization of the Director-General. The invitation extended to the members of this and other local associations, that of the Director-General and our appeal to the members generally have resulted in a large number of men applying for commissions in the Australian Army Medical Corps Reserve.

We have called attention from time to time to the urgent necessity of the establishment of an orthopædic service within the Medical Services, and in this demand support has been lent by the Victorian Branch and the South Australian Branch of the Association. We regret that no steps have been taken to institute such a service. An orthopædic department is being equipped at the No. 4 Australian General Hospital at Randwick, and orthopædic work is being carried out at other hospitals; but there is a vast difference between this and the adoption of the plan suggested by us, similar to that formulated by Colonel Robert Jones in England.

The work of looking after returned wounded soldiers is proceeding on somewhat irregular lines.

Early in the period of the war a series of committees were appointed for this purpose, but their duties do not appear to have been defined with precision. The Federal Parliamentary War Council and the six State War Councils were supposed to undertake this work with the assistance of the Federal Medical War Committee and the six State Medical War Committees. In some States the State Medical War Committee have continued to give assistanee to wounded men to the best of their ability since their appointment. This is notably the case in South Australia. The provision of artificial limbs and the task of preparing men for following a suitable calling after recovery has in many cases been fraught with difficulty. The quality of the limbs offered has not always been satisfactory, and in not a few cases returned soldiers have resisted the endeavours of these and other bodies to equip them for suitable callings. In New South Wales the Red Cross Society took over the task of supplying artificial limbs for a considerable time; but we learn that the official committee is again taking this matter up and endeavouring to carry out the functions for which they were appointed.

During the course of the year the Department sent out three fully-equipped field ambulances and one single general hospital. It was originally intended to set up a double hospital, but circumstances decreed that a single hospital would have to meet requirements. In addition, one clearing hospital was organized and sent forward. A marked advance has been effected in regard to transport service. Instead of leaving the medical service of ships conveying troops to Europe and Asia and of ships conveying returned men back to Australia to be in charge of any doctors, nurses and orderlies that could be obtained at the moment, four regular hospital transport sections have been established, and in this way the needs of the men passing to and from Australia are attended to more satisfactorily.

The Australian Universities have succeeded in supplying the Defence Department with an adequate number of eminently suitable young graduates for service at the front.

Preventive Medicine.

The routine work of the Federal Quarantine Bureau and of the various State Departments of Public Health has been conducted in an admirable manner, and although it is impossible within the scope of this article to enumerate the various activities of these responsible authorities in protecting the public and in combating disease, our retrospect would be incomplete without a passing reference to this important matter. In the Federal Quarantine Bureau 1916 will remain a marked year. The appointment of Dr. Penfold as Director of the Federal Serum Institute and his arrival in Australia opens a new chapter in the history of bacteriology in Australia. The Institute is now in course of construction, and we shall certainly hear a great deal more of this department within the next few years. The Quarantine Bureau has issued several Service Publications, dealing with yellow fever, cholera, rodents, cerebro-spinal meningitis, causes of invalidity and cancer. Special mention should be made of the publication on cerebro-spinal meningitis by Drs. Stewart and Fairley. In addition, the report on the causes of invalidity has attracted much attention, and has given rise to careful thought on the part of the profession. A Committee was appointed in January to examine in detail some of the principal causes of invalidity and death, and this Committee has issued reports on diphtheria, the risks of middle age, venereal disease, enteric fever and tuberculosis. With the exception of the last-named, these reports have been reviewed at some length in these columns. The report on tuberculosis will receive attention at an early date. As a result of the recommendations contained in the report on venereal diseases, the Federal Government has offered financial assistance to the various States to enable them to carry out an organized campaign against these damaging affections. In some cases the offer has been accepted, while in others it has been held in abeyance or even refused. We understand that venereal hospitals in connexion with the quarantine stations have been sanctioned for Sydney and Brisbane. The stations themselves have in some cases been materially improved during the year, and plans for still further improvements have been drawn up and the work put in hand. The Department has directed much attention to the supervision of proprietary medicines under the provisions of the Commerce Act, and the restrictions have been tightened not inconsiderably. The literature has been revised

in such a manner that the claims published concerning the permitted remedies may correspond to the known action of their constituents. A mosquito survey of the irrigated areas along the course of the River Murray was started in October by Mr. F. Taylor, of the Australian Institute of Tropical Medicine. Mr. Taylor completed a mosquito survey between Brisbane and Burketown in 1915.

We wish to take this opportunity of expressing our gratitude to Dr. Paton, the Director-General of Public Health of New South Wales, for having at short notice placed at our disposal valuable information regarding the work conducted in his Department during the year. The material is too extensive for reproduction at present, but we hope to publish it in the near future. We have also to thank the Commissioner of Public Health of Queensland for having supplied us with information regarding the work of his Department during the year. Requests for similar information were addressed to the other State Public Health Departments, but no information has been supplied.

In New South Wales, one of the most important measures directly concerned with the prevention of disease is the extension in October of the notification of pulmonary tuberculosis to the Blue Mountain Shire and Katoomba Municipality. The epidemic of variola has nearly exhausted itself, although the discovery of a case in Coonamble has caused the authorities to make enquiries, which have revealed evidence showing that the disease is still smouldering in the district known as the Pilliga Scrub. The total number of cases notified during the year was 106. Since July, 1913, there have been 1,073 cases. The Department have been faced with a larger amount of diphtheria than usual, and activity has also been exercised in the attempt to deal with epidemic cerebrospinal meningitis and anterior poliomyelitis. An investigaton has been undertaken by the officers of the Bureau of Microbiology into the epidemiology of dengue fever, and the claim has been put forward that the virus is transmitted by the *Stegomyia fasciata*. The evidence on which this claim is based has been published in these columns in September.

Satisfaction may be expressed at the improvement of the control of dairies and of the milk supply of New South Wales. Dr. Paton holds the opinion that dairymen have been forced to realize that the inspector is their friend and that the improvements and alterations have been for their benefit, as well as for that of the community. In close connexion with this work is that of controlling the standard of milk. The Department insists on a fat content of not less than 3.2%. This decision has been adhered to firmly, despite all endeavours to obtain a concession. We propose to return to the physiological aspect of the milk question in the near future, and content ourselves at present with the record of fact. The Department has done excellent work in improving the mode of protecting bread during delivery from dust and dirt, and in controlling the preparation of food and its sale. Energetic measures are being taken to prevent fine fruit being exposed on the surface of a heap offered for sale and a less good quality being handed to purchasers. The control of foods supplied for transports has been of great value. During the year, none of the samples taken for analysis were of inferior quality. The Department has done sterling service in prosecuting vendors of falsely-described remedies and "cure-alls," and in obtaining an exposure of the swindles and a fine in each case.

The Government Analyst claims to have discovered radio-active substances in the Moree Bore water, equivalent to 0.0000001 mgr. of radium in each litre.

From Queensland we learn that the most important innovation of the year was the issuing of regulations dealing with rat and mosquito destruction. The onus of carrying out the instructions rests with the local authorities, and, if enforced, these measures should have a highly beneficial effect on the incidence of mosquito-borne diseases, as well as building up a better barrier against rat-borne diseases, such as plague. On the other hand, the abolition of the Northern Sub-Officer at Townsville, which was effected in May, may be regarded as a weakening of the defences against the introduction of exotic disease. Fresh standards for food and drugs have been issued in December. Mention will be made below of the action taken in regard to the control of venereal diseases.

Legislative Measures.

The Federal Parliament has not concerned itself much with matter affecting the public health. Men-

tion should be made of the passage of the Daylight Saving Bill, which has a hygienic as well as an economic aspect. The Victorian Parliament has spent much time over the consideration of a Bill to check the ravages of venereal diseases. The provisions of this Bill are similar to those of the Western Australian Health Act of 1915. A University Bill, conferring the power to grant degrees on those entitled to receive them in the event of the recipient being killed on active service, passed through all its stages. A Lunacy Bill was read a third time in both Chambers in October. This measure is largely of legal import. A Bill dealing with the control of infective diseases in hospitals has also received attention, and is nearly through the various stages. Another measure of comparatively small importance which has reached its third reading is the Medical Act Amendment Bill. Both in regard to this measure and also in regard to the Venereal Diseases Bill, the Victorian Branch of the British Medical Association has prevailed upon the legislature to modify certain clauses. The Compulsory Vaccination Abolition Bill passed its second reading in the Assembly in November. It has not been so lucky in the "other place." Finally, the Nurses' Registration Bill met with difficulties, and was withdrawn. Mention should also be made of the Health Act Amendment Bill, which received Royal Assent on December 30, 1915, and which may be regarded as a 1916 measure

In Queensland, the clauses of the Health Acts, 1900-1911, dealing with venereal diseases have not worked smoothly, and, in consequence, a Bill containing the majority of the provisions of the Western Australian Act has been introduced. This Bill has arrived at the committee stage. We have also to note the passage of the Opticians' Bill through the Legislative Assembly. The Queensland Branch of the British Medical Association has taken steps to prevent its passage through the Council.

In South Australia the only measure of importance dealing with medical matters is the Health Act Further Amendment Bill, which passed its third reading in the Legislative Council in September.

In the New South Wales Parliament no measure of direct importance to the medical profession has been dealt with. The Oaths Amendment Act became law in March, and a Bill amending the Dentists Act received assent in October. The Workers' Compensation Bill is still receiving attention. A Select Committee appointed to enquire into and report on the prevalence of venereal diseases has collected a great deal of evidence during the year.

In Western Australia an amending Act to the Health Act received assent in September. The first report on the working of the venereal diseases provisions of the Health Act has been issued, and was published in these columns in December.

Scientific Work.

The effect of the war on the work of the medical profession has shown itself very clearly in the laboratory. But little work of marked importance has been achieved, and those who have remained at their posts have had to apply themselves diligently to their routine tasks, in order to keep abreast of the time. It is, however, extremely gratifying that so much excellent original research has been conducted. A combined study of the nature and pathology of Friedreich's ataxy by Drs. Litchfield, Latham and Campbell, which was communicated to the New South Wales Branch of the British Medical Association in November, and which will be published in this journal shortly, deserves special mention. Much good work has been accomplished on epidemic cerebro-spinal meningitis, and we would refer to the bacteriological studies by Drs. Bull, Fairley and Douglas, as meriting careful analysis. Dr. R. J. Bull, in collaboration with the Veterinary School of the Melbourne University, prepared a large supply of anti-meningococcal serum. This serum was tested by the agglutination and complement fixation tests, and proved to be twice as potent as Parke, Davis & Co.'s serum, and from four to eight times as potent as The Lister Institute serum. Dr. R. J. Bull has also carried out some work with very encouraging results on the presence of *bacillus typhosus* and *bacilli paratyphosus* A and B in the stools of returned soldiers. A high degree of excellence characterizes the work on trachoma, on sprue, on arsenic and lead poisoning in Queensland and on the effect of tropical conditions on European children which has been carried out at the Australian Institute of Tropical Diseases. In the Melbourne University, Professor Osborne has conducted observations on climate, and these studies,

taken together with those of Mr. Bruce on light and climate, have an important hygienic bearing. Professor Berry is engaged on an investigation, the object of which is to determine the correlation between the size of the brain and intelligence. Some valuable work on the composition of human milk under Australian conditions has been carried out by Dr. Wardlaw, and this research is now being extended to cow's milk. Dr. Petrie has investigated the chemical composition of active substances isolated from *Duboisia myoporoides*, *Duboisia leichhardtii*, *Nicotiana sauveolens*, cyanogenetic glucosides, and various species of *Colocasia*. Mr. H. G. Smith and Mr. R. T. Baker have carried out some economic investigations on the oils of eucalyptus and melaleuca. Dr. Cooksey has dealt with the composition and impurities of condensed milk, and has thrown much light on this subject.

The institution of the Federal Advisory Council of Science and Industry and the development of the Science and Industry and of the Public Health Sections of the Royal Society of New South Wales have done much to further the interests of science, to facilitate research and to bring the fruits of academic study into practical fields. The collaboration of the scientist and the practitioner in all walks of life is now assured, and both in medicine and outside it this mating will prove of incalculable value to the community.

Dr. S. A. Smith has completed his work on the Talgai skull, and the specimen so patiently and skilfully pieced together stands as a record of archæological worth.

From a more clinical standpoint, the communications by Dr. Hamilton Russell on fracture of the lower extremity, by Drs. Cleland and Burton Bradley on dengue fever, mentioned above, and by Professor Welsh on the serum treatment of epidemic cerebro-spinal fever, by Dr. Sydney Pern on goître, and by Dr. Molesworth on syphilis may be cited as demonstrating the sound work which has been carried out in Australia during the year just ended.

The British Medical Association.

From the records published from time to time in these pages members will have followed the activity of the British Medical Association in the various States, and will have gained growing confidence in the representatives chosen to direct the affairs of the Branches. It is unnecessary in this place to refer in detail to the numerous matters which have received the attention of the Branches during the year. The utility of the Association grows as the members take an increasing interest in things which affect the profession and the community, and we would counsel members to read carefully the records of medico-political discussions and resolutions as they appear in our columns. No action is taken without due regard being given to the interests of the populace at large, and an education in these matters can be gained by following the march of events, both in England and in Australia, and by looking at the questions from both points of view.

Personal.

We regret to record the death of Dr. Matthew F. Kelly, which took place at Ballarat, Victoria, on December 27, 1916. Dr. Kelly had been suffering from the effects of a paralytic seizure for three weeks.

The Sydney Medical Mission has sustained a severe loss through the death of Dr. Julia Carlile Fox (née Thomas), which took place on December 28, 1916. Dr. Fox was the wife of Dr. W. A. Fox, the Medical Superintendent of the State Hospital, Lidcombe, New South Wales. We hope to publish an account of her career in a subsequent issue.

Dr. Louis Henry has recovered from his recent illness, and has resumed his practice at St. Kilda.

Dr. H. G. Loughran has been recommended for appointment as Public Vaccinator for the Midland District, Kyneton, Victoria.

WOMEN DOCTORS.

Women students are, in future, to be admitted to Charing Cross Hospital, London.

At the commencement of the war, both St. George's and St. Mary's decided to receive a limited number of women students who had passed through certain preliminary courses at the London School of Medicine for Women.

This tardy admission of women students to the London hospitals is in great measure attributable to the war.

Some time ago the Army Council issued an instruction that all fourth-year students were to go on with their studies, in order to enable them to qualify before joining the Army. They defined a fourth-year student as one who had passed the intermediate or second stage. The student who begins at sixteen has, therefore, only got two years, the minimum time, in which to pass the intermediate examination in order to exempt him from military service. If he is not through in record time and at record age, he must enlist.

And it is because so many have gone in this way that women have got the opportunity to "carry on" in the hospitals, which, in their own interests, find it necessary to keep the number of students up to full strength.

Therefore, as the Government's restrictions may mean a shortage of male students, the door has been thrown open to women aspirants.

Abstracts from Current Medical Literature.

THERAPEUTICS.

(1) Methods of Raising a Low Arterial Blood-pressure.

W. M. Bayliss (*Proc. Roy. Soc., London, B*, November, 1916) points out that low arterial blood-pressure observed in clinical practice or in the physiological laboratory may be produced in two ways. There may be a deficiency of blood in the circulation, or the quantity of blood may be sufficient if the vessels be not too greatly diluted. With a diminished amount of blood the low arterial pressure is due to decreased output from the heart into the aorta. With a normal volume of blood and an efficient contraction of the heart the blood-pressure may be low if the peripheral blood-vessels be dilated. When the arterial pressure has fallen from loss of blood the pressure can be raised only a certain amount by the injection of saline solution in volume equal to that of the blood lost. If the viscosity of the solutions injected be raised to that of the blood, the solutions may serve to raise the blood-pressure to its former height. The effects of saline solutions on the arterial blood-pressure endure for less time than the effects of solutions containing gum and gelatine. These solutions have a high osmotic pressure, in consequence of which less fluid is lost into the tissues from the blood-vessels than is the case with solutions of salts. Gum-acacia in 7% solutions has a viscosity equal to that of blood. Such a solution contains calcium in abundance, the excess of which can be removed by alkalis. Gelatine is also very suitable. Soluble starch, amylopectin and agar are not suitable for this purpose. When the diminished arterial pressure is low from loss of vascular tone the pressure can be raised by the use of solutions containing gum or gelatine, but the pressure is not maintained at any considerably raised level for more than five minutes or so. No benefit has been observed from increasing the viscosity of the injected fluid above that of the blood. The experimental investigation was carried out on cats, but much study of the effects of viscosity on the flow through tubes under constant pressure was made with an artificial model.

(2) Poisonous Plants of Ontario.

F. A. Clarkson (*Canadian Practitioner and Review*, November, 1916) gives some notes on some of the poisonous plants found in the province of Ontario, Canada. He divides these plants into three groups, those poisonous when eaten, those poisonous when touched, and those with poisonous pollen. Of the indigenous plants there are only three which are dangerous to life when taken into the stomach, two fungi and an umbelliferous plant, the water-parsnip. The toxic fungi are the fly agaric, *Amanita muscaria*, and the death-cup fungus, *Amanita phalloides*. The fly agaric is intensely toxic, the lethal dose for man being 0.06 grain. It causes vomiting, diarrhœa, suppression of urine and giddiness. Death occurs in delirium or stupor. The treatment is the early administration of full doses of atropine, which is the physiological antidote of the active constituent, muscarin. The death-cup fungus contains a poisonous body, phallin for which no antidote is known. The water-parsnip, *Cicuta maculata*, is closely allied to hemlock. Of the poisonous pollens which have been found in the laboratory to cause hay-fever, two species of ragwood are the most abundant. The common ragwood, *Ambrosia artemisiaefolia*, and the giant ragwood, *A. trifida* occur. The former is much more common. Eradication of the plant is all that is necessary to prevent the effects of this scourge, which affects one per cent. of the adult population. Among plants causing dermatitis are the poison ivy, *Rhus toxicodendron*, the lady-slipper orchid, *Cypripedium spectabile*, and the common nettle, *Urtica gracilis*.

(3) Diet in Beri-Beri.

W. H. Wilcox describes the treatment, dietetic and medicinal, of beriberi (*Journ. Roy. Army Med. Corps*, August, 1916). His account is based on the study of 50 cases seen in the Mediterranean area during the last twelve months. The dietetic regime is based on the advice of Major C. J. Martin, F.R.S., whose experience at the Lister Institute had given him an insight into the pathology of the condition. Absolute rest in bed is essential in the early stages and in all cases showing a cardiac lesion. The diet should be light and mainly liquid. Yeast is given freely. Two ounces of dried yeast are administered daily. The yeast is made up as a cream with boiled milk, and the mixture stirred into a larger quantity of milk, which is flavoured with sugar. Pea-soup is allowed, since the pea-flour contains the vitamines antagonistic to beriberi. Three or four raw eggs are added each day to the diet. The juice of three or four lemons is given to supply the anti-scorbutic vitamines. This addition is made, since scurvy and beri-beri are closely related ætiologically. When the patient can take solid food the diet consists of the following articles in addition to yeast: eggs, raw or lightly cooked, brain, liver, sweetbread, kidneys, heart muscle, peas, haricot beans, Katjang idjoe beans, lentils, porridge, brown bread and fresh milk. Fish, meat, fresh vegetables and fruit are given to make up an ample diet where there is no gastric disturbance. The medicinal treatment is directed to such symptoms as may arise. The cardiac symptoms require digitalis, strychnine, strophanthus and oxygen. The neuritic symptoms require massage and electric treatment.

(4) The Use of Emetin.

A. C. Reed has prepared an account of the history, pharmacology, toxicology and uses of emetin (*Boston Medical and Surgical Journal*, September, 1916). It appears that ipecacuanha was introduced from Brazil into Europe in 1648, and that it was used forty years later in the successful treatment of the Dauphin during an attack of dysentery. The treatment of dysentery by its use was adopted for some years, but slowly lapsed into disfavour. In the early decades of the nineteenth century the treatment was again employed by military physicians, especially those who had been in service in India. The discovery by Vedder of its amœbacidal power (1912) has much extended its use. In 1817 Pelletier separated a mixture of alkaloids, to which the name of emetin was given. In the last few months pure emetin has been isolated, and synthetic emetin has been made by the methylation of cephælin. Commercial emetin contains another alkaloid, ipecamine, and traces of other bodies. Pure emetine is stated to be devoid of emetic properties. Its toxicity is less than that of the impure article. So far no literature is available on the pharmacological action of the pure product. Poisoning by emetin is shown by gastro-intestinal irritation, low blood-pressure, with rapid heart-beat, and often a general condition difficult to distinguish from acute beri-beri. With regard to its dose in dysentery, the author inclines to the use of single daily doses of one grain, continued for six or eight doses. After an interval of a week, two-thirds of the previous number of injections are administered. Children show a relative tolerance to the drug. Emetin is used in the treatment of amœbic dysentery, tropical abscess, and amœbic pyorrhœa on account of its parasiticidal effects. It is also used as an expectorant and in the treatment of hæmoptysis.

UROLOGY.

(5) Non-tubercular Renal Infection.

Hugh Cabot and E. Granville Crabtree (*Surg. Gynec. and Obstet.*, November, 1916) have analysed the ætiology and pathology of renal infections from the experimental, clinical and pathological points of view, and attempt to remove the confusion which exists in connexion with these infections. They establish the fact that bacteria circulating in the blood can be excreted by the kidney without producing gross lesions. On the other hand, lesions may be produced during the passage of bacteria through the kidney, and a bacilluria may be set up in addition to the bacillæmia. They find that there is no experimental data to support the assumption that infection ascends directly along the urinary passages. When there is obstruction of the ureter, peristalsis may be re-

versed and an infection may travel upwards towards the kidney. Incompetence of the uretero-vesical sphincter associated with extreme dilatation of the ureter may place the renal pelvis in direct open communication with the bladder cavity, and infection may result as a consequence of backwash. They conclude from their own observations and from the published experimental work that lymphogenous infection does not take place. A study of the lesions discovered in 60 cases of non-tubercular renal infection has produced incontestible evidence that pyogenic organisms give rise to lesions easily distinguishable from those produced by non-pyogenic organisms. They consist of perinephritic abscess, capsular abscess, capsulitis, cortical abscess, septic infarct and diffuse suppuration. The authors publish the details of all their cases, together with microphotographs of the lesions found. Bacilli of the colon-typhoid group give rise to acute pyelitis, acute pyelo-nephritis, chronic pyelo-nephritis and pyo-nephrosis. In the third series of cases they discovered that infections with both forms of organisms led to lesions characteristic of both groups. As a rule infection with the colon bacillus precedes infection with pyogenic cocci, and the lesions of the renal pelvis usually predominate. They were unable to distinguish the lesions of so-called ascending infections from those of excretory infections. It has been shown that organisms concerned in renal infections may appear promptly in the urine, though they may not persist. They also find that organisms not concerned in renal infections may appear in the urine. Lesions due to pyogenic organisms are usually characterized by the appearance of the bacteria in the urine during the early stages only. Considerable quantities of pus are rarely found in association with these lesions. The urine usually contains abundant bacteria and pus in lesions produced by non-pyogenic bacteria. Suppurative infections which involve chiefly the cortex and produce but little change in the convoluted tubules do not interfere with the renal function to a marked degree. The functional tests are therefore almost normal in these conditions. In conclusion, they find that suppurative lesions demand operative treatment, and are rarely amenable to drug treatment. Infections with organisms of the coli group can be dealt with by formaldehyde-containing drugs in view of the fact that the damage to the kidney is usually slight and transient, and that once the organisms have been killed the cells undergo spontaneous repair.

(6) Bladder Symptoms.

A. M. Wose (*Urol. and Cutan Review*, September, 1916) deals with symptoms or urinary lesions which are referred to the urinary bladder. He regards cystitis as a symptom rather than a disease, and states that the infection by bacteria may descend from the kidneys, ascend from without through the urethra, or attack the viscus from the adjoining organs. He considers hæmatogenous infection as probably not existing. The infections from the kidney are caused by *bacillus coli communis*, *bacillus typhosis*, *bacillus tuberculosis* and the pneumococcus. The infections through the urethra are caused by *staphylococci*, *streptococci*, *diplococci*, *streptobacilli*, members of the proteus group, *urobacillus liquefaciens septicus* and the normal urethral flora. The urine normally sterile, and the author maintains that highly virulent cultures of invading bacteria are needed to infect the normal bladder. Unless there is some alteration in the urinary flow or in the mucous membrane, no inflammation will follow. Urinary obstruction may occur above or below the bladder. Calculi narrowing of the urethral canal and new growths may cause obstruction. In the next place he deals with hyperæmia of the bladder and with trauma. Having demonstrated that bladder lesions have a wide ætiological source, he sets up a classification in order to gain a full survey of the conditions associated with vesical symptoms. He distinguishes primarily nephritis, pyuria, hæmaturia and hæmato-pyuria. The three last named are subdivided into renal, ureteral, vesical and urethral. Vesical pyuria affects certain areas of the bladder. The most common are the neighbourhood of the sphincter, and that of the ureteral openings. In these situations the mucosa may be reddened, swollen, œdematous and hæmorrhagic. In acute conditions, shreds of exfoliated ephithelium and strings of pus adhere to the surface. When the whole bladder is involved the mucous membrane becomes dulled and clouded, and the blood vessels less differentiated. The urine is generaly acid, and contains pus, bladder epithelium, detritus and blood corpuscles. As the inflammation extends trabeculæ form, the muscular coat hypertrophies and the cavity becomes contracted. When there has been severe trauma gangrene may supervene. The illness usually begins with a rigor which is followed by fever, depression, anorexia and constipation. The constitutional symptoms cease before the process reaches its acme. Signs of local irritation are present, and include frequent and painful micturation. Pain is usually well marked, and is often referred to the pelvis or groins. The author deals with the significance of pus and blood in the urine, and their sources. At times all the characteristic features are absent. In doubtful cases the diagnosis should be made with the aid of the cystoscope. The treatment of cystitis is dealt with under three headings: first there is the eradication of the cause: next there are the medicinal methods; and lastly there is local treatment. With medicinal treatment he includes rest, baths, and free diuresis by drinking water or by giving acetate or citrate of potash, to which belladonna or hyoscyanus may be added. For nervous tension he recommends chloral or bromide of potash, and for pain and spasm morphine. Local treatment consists in irrigating the bladder with solutions of boric acid or permanganate of potash. After a time he changes the substance to argyrol or protargol, and later to oxycyanide of mercury or silver nitrate. For tuberculosis of the bladder, in addition to hygenic treatment, tuberculin may be used, although its value is questioned. For local application he recommends iodoform emulsion or gomenol. He has not obtained good results from vaccines in bladder inflammations.

(7) Laboratory Tests in Nephritis.

Arthur F. Chance and Victor C. Myers deal with the value of various laboratory tests in the diagnosis and treatment of nephritis. (*Journ. Amer. Med. Assoc.*, September 23, 1916). They find that the volume, specific gravity, albumin, casts, chlorides and total nitrogen in the urine determined by an examination of the urine do not suffice to give full information in regard to the function of the kidneys. The introduction of the phenolphthalein test by Rowntree and Geraghty and of the lactose and iodide tests had marked a decided improvement. More recently Mosenthal has pointed out that a considerable amount of important information is gained from the observations of the volume, specific gravity, chlorides and nitrogen output of the night and two-hour day urine specimens of nephritic patients, when placed on a definite test diet. The value of these investigations is, however, not fully appreciated, probably because of the time and care required in the collection and analysis of the specimens. McLean and others have suggested that much information can be obtained from an analysis of the nitrogen content of the blood and of the urine. The urea and non-protein nitrogen of the blood has been estimated for this purpose, but the authors find that scant attention has been given to the uric acid and creatinin values. They have employed both the phenolphthalein test and the blood analysis, and discuss the results of their observations. It appears that an increase in the amount of uric acid of the blood is a valuable sign in the early diagnosis of nephritis. In cases of moderate severity the estimation of urea in the blood is important in guiding the physician in treatment. Changes are mirrored in this manner rapidly. The variations in the creatinin content of the blood have proved to be reliable in forming a prognosis. When there are over 5 mgrs. per 100 c.cm death invariably follows within a short time. They regard the determination of the power of the plasma to combine with carbon dioxide (according to Van Slyke) as a valuable index to the acidosis of nephritis. This is of diagnostic and prognostic importance. They also point out that in advanced diabetes complicated with nephritis the absence or presence of glucose in the urine does not give any indication of the glucose content of the blood. They advocate a direct estimation of the sugar in the blood in these cases.

SURGICAL EXPERIENCES IN THE BATTLE OF JUTLAND.

The *Journal of the Royal Naval Medical Service* contains four papers dealing with the treatment of wounded in the battle of Jutland, in its issue dated October, 1916. Fleet Surgeon Alexander MacLean and Surgeon Horace, E. R. Stéphens, both of H.M.S. Lion, describe their experiences in the hope that these may prove interesting to others, since the conditions under which naval medical officers have to work in action differ so widely from any that they may have encountered in other practice. Staff Surgeon J. McA. Holmes gives an account of the treatment and disposal of the wounded in a light cruiser during action. Mr. L. Fraser discusses the treatment of wounds received in naval action, and Fleet Surgeon John R. Muir, attached to H.M.S. Tiger, writes: "Hints for the use of Medical Officers in Action," based on his experiences in the battles of Jutland and the Dogger Bank.

The medical organization on H.M.S. Lion possessed two distributing stations for the shelter of the medical staff, stretcher parties, instruments, and medical stores. These were divided as equally as possible between the two stations. The forward station was small, though well protected. As it would accommodate not more than a dozen wounded, only walking patients proceeded to it. The after station was too small for the accommodation of wounded, so that stores and instruments were kept in it. During action the mess-deck, which was behind armour, received all the stretcher cases which were placed in bathrooms or on mess tables. The wounded were not carried further than necessary. Those wounded in turrets and isolated compartments were only moved out of the way, and were not brought to the mess deck until a lull occurred in the action. Elaborate precautions and preparations were taken, but ought to be avoided. The part of the mess deck which had been thoroughly prepared for the reception of wounded could not be used at all, as it was rendered untenable by fumes and smoke at the outset of the action. Most benefit was derived from canvas bags containing antiseptic and picric acid dressings, a tourniquet and bandages. These were placed in turrets, engine-rooms, boiler-rooms and other compartments as well as on the mess deck itself. These bags were replenished as needed from the stations. Well-trained first-aid parties, made up of writers, cooks, stewards, and canteen hands, did most valuable work, as the rest of the ship's company shrank from dressing wounds, although they would tend fallen shipmates with brotherly affection. Ventilating fans were run on the mess deck until the action started, when they were switched off. On the lower decks they were kept running during the action. The delivery openings for fresh air were filled with shavings medicated in the same way as the tubular respirators. Respirators and anti-gas goggles were issued to each turret compartment, and to the mess deck. Although there was much trouble on the mess deck from smoke, burning débris, and T.N.T. fumes, no cases of gassing occurred. The simple respirator of gauze and waste proved so efficient that the tubular respirators were not called into employment.

Nearly all the casualties on this ship occurred within the first half hour. A few patients found their way to the fore station, but the majority remained on the mess-deck. During the first lull the medical officers made a tour of inspection of the ship. The scenes that greeted them beggared description. Most of the wounded had already been dressed. Tourniquets had been applied in one or two instances, though hæmorrhage was less than might have been expected from the extensive lacerated wounds. As there was much water about the wounded were kept dry and warm on tables. Morphine in 0.04 gm. doses was given hypodermically by the medical officers alone to all the wounded. The Wildey syringes were excellent, though the needles might have been stouter. The medical officers state that these maximal doses of morphine relieved pain and controlled hæmorrhage instantly. Such large doses caused no symptoms of overdose when administered soon after the receipt of the injury and before the reserve of stamina of the healthy men had been lowered by pain. The battle was thrice renewed in the evening, but the wounded were all carried in lulls to the mess-deck. No splints were applied since tthe Neil Robertson stretcher answered the purpose admirably. After the action was over the injured were kept warm throughout the night with blankets and hot bottles, while they were fed occasionally with bovril and medical comforts. During the evening ten of the desperately wounded and burned died. It was impossible to move any of the wounded during the night owing to the probability of a renewal of the action at dawn. Many of the wounded slept undisturbed.

At 7.30 o'clock the next morning the medical officers were informed that it would be safe to bring up the wonded from below. The Vice-Admral's and captain's cabins, which were full of smoke and water, were cleaned, dried, and thoroughly ventilated. A start was made at 8.45 a.m. with the treatment of the wounded, the captain's bathroom serving as an operatiog theatre. Fifty-one patients were dealt with, and a general anæsthetic was administered to twenty-eight. Two officers gave much assistance by administering anæsthetics. After operation the patients were placed on bedding on the decks of the Vice-Admiral's and captain's quarters. No mishaps occurred, and all the wounded were discharged without a further death. Urgent operations only were performed. Full exploration of large wounds was impossible for lack of time. Two amputations were postponed for a similar reason. Three amputations of the lower limb were carried out. Five compound comminuted fractures of the leg were treated with splints. The surgical toilet of wounds consisted of swilling them out with eusol, draining, trimming and suturing when needful. Abdominal injuries were absent. Although the wounds remained with first-aid dressings from sixteen to thirty hours sepsis was much less frequent than the conditions warranted the medical officers to expect. Eusol was the only antiseptic applied to the wounds. General burns, invariably due to cordite fires, were severe and fatal. Almost 50% of the wounded suffered from burns of the face and hands alone. These burns were caused by the flash of high explosives in a confined space. The flame was so momentary that clothing completely protected the rest of the body. The ankles were scorched in a few cases, but this did not occur when the trousers were tucked inside the socks. The eyes being closed in time escaped injury. Masks and gauntlets would probably prevent many casualties among repair and fire parties on the lower decks. The picric acid dressing was most satisfactory as a first-aid dressing to burns. This dressing was, however, liable to become dry if left on too long, despite the covering of mostig batiste. The dressings were difficult to remove when dried. As a second dressing eucalyptus and olive oils were applied, and covered with fomentations. Notes on every case were taken in shorthand at the time. These notes included the name, age, rating, nature of injuries and treatment. They were found most valuable later. Prior to leaving the theatre each patient was labelled with the notes. The last case was finished at 12.15 o'clock on the morning of the next day, when the medical staff went to a much-needed rest.

On arriving at the base on the same day forty-six wounded were transferred to the hospital ship "Plassy," while five cases of slightly wounded were retained on board. Nine days later a report was received from the medical officers on the hospital ship "Plassy," giving an account of fourteen of the extensively wounded patients. These were cases not of burns but mostly of multiple injuries, including the five compound comminuted fractures. Nine wounded had no septic wounds, while five patients had septic wounds. In all the septic wounds portions of clothing had not been removed at operation. The medical officers record with gratification the work of the their staff, which was sadly depleted during the action, as many as 44% of the sick berth staff coming into the casualty list.

The light cruiser in which Staff Surgeon J. McA. Holmes served, came into contact with the enemy on the evening of May 31, 1916. The ship was engaged on and off at intervals throughout the night. A severe engagement occurred with three enemy cruisers about 9.45 p.m., when all the casualties were received. Forty-one wounded were noted, of whom twelve died almost instantaneously. The wounded were sent to two dressing stations, one forward

and the other aft. These dressing stations were on the lower or main deck, and were close to galleys, so that a supply of hot water was always available. Open hatches were conveniently situated to the dressing stations, and patients who could walk descended by them. As the crew had been previously trained in man-handling wounded and passing them down canvas chutes in the hatches, stretchers were not used. The effect of the previous training was noted in the speed with which the wounded were brought to the stations. The whole of the wounded were received within five minutes of any lull in the severity of the engagement. The crew put on clean clothing one hour before the action started, and as many as possible took a bath with water containing izal. Twenty-six patients required treatment. Eleven of these had slight wounds, while fifteen suffered from severe injuries. As soon as the injured reached the dressing station they received an hypodermic injection of morphine if they had not been given a dose of anodyne mixture. The wound was washed with corrosive sublimate solution, and covered with cyanide gauze wrung out from 1 in 40 carbolic acid. Any patients who had been dressed on deck were examined, and a fresh dressing applied. At 10.45 p.m. all the wounded had received first aid. As it appeared that thirty-six hours would elapse before the patients could be transferred to a hospital ship it seemed desirable to give more active treatment. The operating theatre was brought into use, and by 9 o'clock next morning all the wounded had been dealt with. As the ship was engaged during the night much difficulty was experienced in this work. The sick-birth steward gave the anæsthetics until 5 a.m., when the surgeon in the forward station was able to come to the aft station. The operations consisted of one amputation of the forearm, several amputations of fingers and toes, removal of splinters from wounds, trimming and suturing of lacerated parts. Among the more severe wounds, all described in detail, was a compound comminuted fracture of the frontal eminence on the left side. The left eye was disorganized. Ten splinters of bone were taken away under chloroform, and a portion of disintegrated bone shaved away. The wound was drawn together with catgut and a drainage tube inserted. No burns were caused on this light cruiser. Fifteen severe cases were transferred to the hospital ship "China," on June 2, 1916. No record was received of their progress. Of the eleven kept on board all had recovered by the fifth day with one exception. This patient had a perforating wound of the wrist, with some loss of skin at the entrance and exit wounds.

Mr. Lachlan Fraser describes forty-three casualties from the battle of Jutland, admitted into the Tynemouth Jubilee Infirmary. Sixteen cases from H.M.S. "A" were received upon June 2, 1916, and twenty-seven cases on June 3 from H.M.S. "B." The first batch of cases had been dressed by Surgeon Probationer Bell, R.N.V.R. The dressings consisted of antiseptic paste and gauze. Some of the men had had serum administered. In the case of H.M.S. "B" almost the first shell had struck the sick bay, killing the surgeon probationer, wounding the sick bay steward, and destroying most of the dressings. The sick bay steward was admitted with the other wounded. He said that the only dressings left by the shell were 1 lb. boric lint, 2 lbs. white lint, 1 bottle of san cresol, 4 oz. tinct. iodi, some picric acid and some bandages. The steward carried the dressings aft, where the wounded were collected. The wounded were dressed by him and given a dose of morphine. The dressings were changed three times on the way to the base. As the dressings gave out he used pieces of clean sheeting. The burns were dressed with picric acid. Four patients died on board soon after being injured, but the remaining twenty-seven did well.

On admission to hospital the patients were placed in bed between hot blankets. They were then labelled "ward" or "theatre." Those not requiring an anæsthetic were treated in the wards. Three surgeons worked at once in the theatre, so that the whole of the wounded were treated rapidly. Sixteen cases required three hours, and twenty-seven cases five hours. The cases which were most collapsed on admission were left to the last. The routine treatment of the wounds was as follows: The surrounding parts were scrubbed and thoroughly cleaned. The wound was washed with normal salt solution, all pockets freely opened, and any visible foreign bodies removed. These foreign bodies consisted of pieces of clothing and fragments of shell. No attempt was made to find hidden pieces of shell. If the wound was not clean it was washed out with 1 in 40 carbolic acid, and afterwards with normal salt solution. When deep cavities existed gauze wrung out from hypertonic salt solution was applied, and continuous irrigation with the salt solution kept up. During the first week in hospital radiographs were taken of all patients. Fragments of shell found in this way were removed.

Among the severe cases was that of R. B., aged 21 years. The left foot had been blown off by a shell. The surgeon probationer had trimmed and dressed the stump. There was a fearful shell wound of the left calf just below the knee, the bruising extending up the lower third of the thigh. The patient had lost much blood, was blanched and almost pulseless. He was given saline solution and brandy *per rectum*. The stump was dressed and treated with hypertonic salt solution. Four days later, as the patient had rallied, the stump, which was offensive, was amputated through the middle of the thigh. The stump became septic, and consequently one month later it was opened up and thoroughly cleansed. The flaps were dried and covered with bismuth and iodoform paste. Two days later there were signs of poisoning with iodoform. A severe secondary hæmorrhage occurred, which necessitated the further opening of the wound. The bleeding was found to be derived from one of the perforating arteries, which was ligated. The patient slowly rallied, and six weeks later was able to get about on crutches. Mr. Fraser says that the wounds received in the naval actions were similar to severe machinery accidents in which much laceration and contusion of the soft parts, splintering of bone, hæmorrhage and shock took place. Except when hæmorrhage was profuse shock did not occur among the picked able-bodied men of the naval ratings. Reaction was also slight after operation. A man whose arm was amputated upon admission wrote a letter with his left hand the following day, and strummed on the piano in a week. He did not progress so quickly after the formal "flap operation" done "in cold blood" some days later. A man with a trephined skull consequent to a fracture played the mandoline while the sister was absent from the ward three lays later with no ill effects.

Fleet Surgeon Muir gives much information of the experiences in action as illustrations of the usefulness of his hints for the guidance of naval medical officers in action. He points out that contrary to the pre-war conception casualties arrived in numbers from the time that the first casualty occurred. Instead of the patients drifting in slowly, so that they could be treated as they arrived, there was nothing to do until twenty seriously wounded men, representing sixty extensive wounds, were brought in for treatment. The Admiralty instructions directed that two distributing stations should be manned, one forward and one aft. In the "Tiger" these stations were supplied in the design of the ship, and their positions could not be altered. As the aft dressing station did not appear to be well protected from plunging shell fire, the surgeon in charge of the station in the first battle was directed to withdraw his parties into the ammunition passages on the disengaged side. The experience in this first battle at the Dogger Bank led to the aft dressing station being rigged in compliance with the Admiralty instructions, but with the consent of the Captain the party in charge proceeded to the forward dressing station on the order "Man the after dressing station." If this had not been done in the battle of Jutland, the whole of the party in the aft dressing station would have been annihilated.

When the bugle sounded "Action stations," the medical staff received their full complement of assistance. In addition to the regular medical party, six stretcher parties were provided. Each party consisted of three persons. These had special training and were most expert in finding their way to the forward station from any part of the ship by the quickest route. As soon as the ratings had assembled, the roll was called by the principal medical officer. Life-saving waistcoats and respirators were served out.

Each stretcher party received a stretcher and a first-aid bag. The senior rating examined the bag and reported any deficiencies. The latest authentic information was given, and the parties are told to do some simple thing. It was found necessary to occupy the time with some work while waiting for the special duties. In one action two hours passed before the first casualty arrived. This waiting was most trying. The noise of the guns was deafening, and the concussion and vibration was so severe that it seemed as if the body was held by the shoulders and violently shaken every half minute. The smell of cordite was sickening in its intensity and penetration. The rumours running along the deck were alarming, and the stampede of fire parties made the heart beat more quickly. The inaction tried the steadiest nerves. On receipt of information that stretcher-bearers were needed, the parties set out from the station. Having sighted the wounded, they covered the more obvious wounds and placed the wounded in the Neil Robertson stretcher. The patient was borne to the station, removed from the stretcher and placed on a couch. Two cooks, under the supervision of an officer, stripped the patient by means of large scissors. When unclothed, the injured man was wrapped in a blanket. The medical officer overhauled the patient and applied dressings. The Chief Writer took down the patient's name and added notes at the medical officer's dictation. The Chief Writer searched the clothing stripped from the patient, and reported to the principal medical officer any valuables found. One man had £19 upon him. The clothes are tied up and labelled with the patient's name. The patient was placed in a cot or upon a table, and served with a half-pint of hot bovril. After the action the work of the medical ratings was heavier. On the bugle sounding "Secure," all the supernumary workers, cooks, stewards, writers, and others placed at the disposal of the surgeons, were called to other duties. As the principal part of the medical department's duty can be attempted only when the action is over, this depletion of the staff is quickly felt.

Public Health.

THE HEALTH OF VICTORIA.

The following notifications have been received by the Department of Public Health, Victoria, for the week ending December 24, 1916:—

	Metropolitan. Cs.	Dths.	Rest of State. Cs.	Dths.	Total. Cs.	Dths.
Diphtheria	37	1	34	0	71	1
Scarlatina	10	0	12	0	22	0
Enteric Fever	1	0	4	0	5	0
Pulmonary Tuberculosis	19	4	6	6	25	10
Cerebro-spinal Meningitis	1	—	2	—	3	—

THE HEALTH OF SOUTH AUSTRALIA.

The following notifications have been received by the Central Board of Health, South Australia, during the week ending December 16, 1916:—

	Adelaide. Cs.	Dths.	Rest of State. Cs.	Dths.	Totals. Cs.	Dths.
Pertussis	4	0	36	1	40	1
Morbilli	5	0	38	0	43	0
Pulmonary Tuberculosis	0	3	9	3	9	6
Enteric Fever	1	0	12	0	13	0
Diphtheria	2	1	7	0	9	1
Scarlatina	1	0	2	0	3	0
C'bro-Spinal Meningitis	3	0	1	0	4	0

THE HEALTH OF WESTERN AUSTRALIA.

The following notifications have been received by the Department of Public Health during the week ending December 9, 1916:—

	Metropolitan. Cases.	Rest of State. Cases.	Totals. Cases.
Enteric Fever	7	0	7
Diphtheria	12	4	16
Scarlatina	3	0	3
Pulmonary Tuberculosis	5	0	5
Septicæmia	2	0	2
Cerebro-Spinal Meningitis	1	0	1

INFECTIVE DISEASES IN AUCKLAND.

The following notifications have been received by the District Health Officer, Auckland, for the month of November, 1916:—

Disease.	City. Cases.	Suburbs. Cases.	Country Districts. Cases.	Total. Cases.
Scarlatina	7	14	46	67
Diphtheria	5	9	18	32
Enteric Fever	3	4	42	49
Pulmonary Tuberculosis	5	4	19	28
Septicæmia	1	3	1	5
Poliomyelitis	0	0	1	1
Cerebro-spinal Meningitis	1	0	1	2

INFECTIVE DISEASES.

The Bulletin of the Quarantine Service, issued on December 8, 1916, contains the following information:—

Variola.

Since the issue of the last Bulletin, 92 fresh cases of variola and 24 deaths have been reported in the Dutch East Indies. A Bill of Health issued in Hongkong refers to 11 cases and 11 deaths occurring in the week ending November 11, 1916.

Plague.

In the three weeks ending October 28, 1916, the number of cases of plague notified in India was 20,652. In the same period there were 15,882 deaths. During the week ending October 29, 1916, there were ten cases and three deaths in South Africa. A new centre of infection was discovered at Loerie. There were ten cases reported in Ceylon between October 15 and November 4, 1916. One case and one death occurred in the fortnight ending October 14, 1916. Since the issue of the last report from Java one additional case and one death have taken place.

Cholera.

From a Bill of Health issued in Japan it appears that there were 508 cases of cholera at Kobe up to October 31, 1916. A fresh case has been reported daily during the first week of November. The returns in Yokohama include information concerning six cases and eight deaths during the week ending October 30, 1916. There were six cases at Nagasaki and five deaths during the week ending October 21. In the period from October 24 to November 6, 1916, there were two cases and two deaths in the Straits Settlements. The number of cases reported in the Dutch East Indies since the issue of the last bulletin is five, with four deaths.

Typhus Fever.

The following information has been culled from the public health reports of the United States Public Health Service. The period dealt with is from October 7 to October 27, 1916.

Place.	Cases.	Deaths.
Austria-Hungary	2	1
China	1	—
Egypt	443	188
Greece	—	10
Java	25	3
Mexico	699	43
Russia	245	12
Spain	—	1
Sweden	3	—
Switzerland	3	—
Turkey in Asia	68	31

THE BOARD OF HEALTH OF NEW SOUTH WALES.

(*Continued from page 566.*)

Prevention of Disease.

In the report of the Director-General of Public Health, various paragraphs are devoted to the measures adopted for the prevention of certain infective diseases. The first measure with this object in view is notification.

Enteric Fever.

During the year 1914 2,284 cases of enteric fever were notified to the health authority. Of these, 663 cases occurred in the Metropolitan Combined Districts. In this area the prevalence of enteric fever was greatest in April, and smallest in September. The deaths numbered 45, and the case mortality was therefore 6.78%. In the Hunter River Combined Districts there were 154 cases and 4 deaths. In the remainder of the State there were 1,467 cases. The disease was most frequent in March, while the number of cases reached the lowest level in September. The case mortality was 8.04%. It thus appears that in the whole State 167 persons died of enteric fever during the year, which is equivalent to 7.31% of the total number of those suffering from enteric fever.

At the outbreak of war the military authorities determined to apply prophylactic inoculation against enteric fever to every soldier leaving the Commonwealth. The Department of Public Health offered to supply, if desired, sufficient anti-typhoid vaccine "to protect all troops that might be despatched from any part of the Commonwealth, and also the services of its medical officers for the inoculation of troops as far as might be desired by the Commonwealth authorities." This offer was accepted, and the men comprising the Expeditionary Force to New Guinea were subjected to one injection before leaving. Sufficient vaccine was placed on board the troopship for the second injection to be carried out during the voyage. The officers of the Department assisted the military medical officers in the work of inoculating the troops in New South Wales. Vaccine sufficient for the protection of 20,000 men was distributed among the capital cities of the other States of Australia, in order that the inoculation of all the troops of the first contingent could be carried out. Dr. Paton continues by stating that "further large quantities of anti-typhoid vaccine have been made for the use of troops leaving New South Wales and Queensland, and all the soldiers leaving this State have been inoculated by our officers as soon as the military could submit them for this mild operation."

Approximately 18,000 persons received two inoculations by the officers of the Department, and vaccine sufficient for the protection of 50,000 persons was supplied up to December 31, 1914. Reference is made to the offer of the Department to apply vaccine free of cost to the civil population in towns in which enteric fever was prevalent.

The Director-General is inclined to belittle the inconvenience following the injection of anti-typhoid vaccine. He states that the immediate ill-effects have been "hardly noticeable." The experience of military surgeons and others does not coincide with the experience of the Department. The matter, however, is of small importance, since the efficacy of these prophylactic inoculations in reducing the morbidity and mortality is now established.

Venereal Diseases.

In July of 1914 a night clinic was opened at the Department's Hospital Admission Depôt. Dr. Paton points out that excellent work was accomplished. A night clinic for the treatment of venereal diseases was opened at the Royal Prince Alfred Hospital later on. Greater facilities for treatment were available at this clinic. It is stated that the success in dealing with these diseases, and the number of persons treated, demonstrated the necessity for taking these special steps. We understand that the night clinic in Macquarie Street was closed after a few months' trial.

Tuberculosis.

During the period covered by the report, pulmonary tuberculosis was not a notifiable disease in any part of the State. The Director-General is therefore unable to make known the prevalence of this disease. He points out that in the year 1913 1,210 persons died from pulmonary tuberculosis in New South Wales. This number represents 669 per million of population. In 1875 the mortality represented 1,050 per million, and in 1885 it represented 1,163 per million. The decrease has therefore been very considerable. He foreshadows the provisions which are included in the Public Health Amending Act of 1915 in regard to the notification of this disease, and to other safeguards.

Nurse inspectors are employed by the Department to visit and advise patients as soon as the health authority becomes aware of the existence of infection. The information obtained enables the Department to classify patients into three groups. In the first place there are those who can be cared for in their own homes, and who can attend at the Anti-Tuberculosis Dispensaries for medical treatment. The second group comprises cases in which the disease has progressed sufficiently or the circumstances of the patient are such as to require his removal to a sanatorium. The third group includes persons whose disease has advanced beyond the hope of ultimate recovery, and for whose medical care and maintenance permanent provision is required. The State has established and maintained a sanatorium at Waterfall, and special wards for persons suffering from pulmonary tuberculosis at the Rookwood State and Newington State Hospitals. In addition, State subsidies are extended to the Queen Victoria Homes for Consumptives at Wentworth Falls and at Thirlmere. Special grants have been made to the Anti-tuberculosis Dispensary, controlled by the National Association for the Prevention and Cure of Consumption, and to the dispensaries at the Royal Prince Alfred Hospital, at the Marrickville Cottage Hospital, at the Royal North Shore Hospital, and at Newcastle. The R. T. Hall Sanatorium at Hazelbrook is not State-aided. Dr. Paton calls attention to the fact that additional accommodation is required for males suffering from this form of disease. Plans had been prepared for the erection of pavilions at the Waterfall Sanatorium to accommodate an additional 100 male patients.

The Medical Superintendent of the Waterfall State Sanatorium publishes a special report in the form of an addendum. During the year 524 patients were admitted, and on December 31, 1913, there were 302 patients under treatment. At the end of the year 316 were still under treatment. Consequently the Medical Superintendent is able to deal with the completed records of 510 cases. There were 130 deaths, and 380 patients were discharged, 96 with their disease arrested, 119 much improved, 125 improved, and 40 unimproved. Twenty-three of the patients were admitted during the early stages of the disease, and in 19 the disease was arrested. There were 140 "moderately early" cases. In this group the disease was arrested in 51. The patients were much improved in 57, and some improvement was effected in 42. The group "moderately advanced" contained 172 cases. In 26 complete arrest was effected. In 54 the condition was much improved. In 76 it was improved. In 16 it was unimproved, and in 28 cases the patient died. The last group of "far advanced" contained 147 cases, 102 of which proved fatal. In this group there were no instances of arrested disease. The average length of stay in the hospital of the 380 patients who were discharged during the year was 193 days.

In the case of those whose disease was arrested the average residence was 271 days. Tuberculin appears to be the most favoured remedy applied. The nascent iodine treatment was tried in a number of cases, apparently with but little success. No appreciable benefit followed the application of a remedy introduced by a medical practitioner from one of the other States, who claimed that he had discovered a cure for tuberculosis. The Medical Superintendent appears to rely more on the effect of light, sunshine, fresh air, regulated rest and exercise, and proper diet than on specifics.

Scarlatina.

During the year 1914 3,207 cases of scarlatina were notified under the Public Health Act. There were seven deaths, which is equivalent to a case mortality of 0.218%. In the Metropolitan Combined Districts there were 1,830 cases,

with a case mortality of 0.27%. In the table of the returns showing the number of cases and deaths in the country municipalities, one death is entered for Coonamble, and in the following table giving the returns from the shires one death is entered from Stroud. In the summary of these returns only one death is recorded in the "remainder of State," that is, outside the Metropolitan Combined and the Hunter River Combined Districts. We assume therefore that the total number of deaths is seven and not six, as stated.

Diphtheria.

The total number of cases of diphtheria registered during the year was 5,852. Of these, 2,280 were in the Metropolitan District, 170 in the Hunter River Combined District, and 3,402 in the country municipalities shires and police districts. There were 170 deaths, which is equivalent to a case mortality of 2.9%. The fatality in the Metropolitan Combined Districts was 2.85%, and in the rest of the State 3.0%. In the Hunter River District there were but two deaths among the 170 cases. The fatal cases occurred almost exclusively in children and young people. Of the 170 patients who died, 135 were under ten years of age, and 161 were under 20. These figures would indicate that practitioners should make an effort to apply the specific treatment at an earlier stage of the disease than is usually done. It appears from the figures published that the incidence of the disease in the metropolis was greatest in May and lowest in October, while in the municipalities and shires a maximum continued from March till August, and a second rise occurred in December.

Poliomyelitis.

The total number of cases of anterior poliomyelitis notified during 1914 was 79, of which 64 were notified in the Metropolitan Combined Districts. There was only one death. In view of the obscurity of the ætiology of this condition, and of the prevalence during the past few months of a severe epidemic in New York, the records for the years 1914, 1915 and 1916 should prove of considerable importance. The almost complete immunity of the population of the Hunter River District from the disease and the relative rareness of it in the country towns and districts should be noted. There are two possible explanations, but it is unfortunately impossible to determine which of the two is correct. Either cases of poliomyelitis occur throughout the State but are not recognized, or the conditions of its spread are inseparably connected with city life. It does not follow that medical practitioners would be responsible for the neglect in notification should the former prove to be correct, since it is quite conceivable that parents in sparsely populated places might not think it worth while consulting a doctor during the acute stage of this disease.

Leprosy.

The Acting Medical Superintendent of the Lazaret has issued the Twenty-fourth Report on Leprosy in New South Wales. From this report it appears that on January 1, 1914, 21 persons were under detention at the Lazaret. Four fresh cases were detected during the year, and the sufferers were admitted to the Lazaret by warrant of the Board. One patient died, and consequently there were 24 patients under care at the end of the year.

A brief account of the new cases is published. The first patient was a male, aged 26, who was born in Young Wallsend, New South Wales. He had lived in the Lower Hunter District all his life, except for about five weeks, when he was at Bulli, and about 14 weeks, when he was at Tamworth. He had been a fisherman first, and then a miner. He was married and had two children. In 1909 he had a fall in a mine and was treated in the Maitland Hospital for appendicitis. Since that time he had been subject to pains in his limbs. There was abnormal bronzing of the forehead, and infiltration of the forehead and eyebrows. Small nodules were seen at the inner side of the cornea, on the cheeks, lips, chin and ear, and macules were found on the anterior and posterior surface of the trunk. The skin of the upper limbs was involved, and marked sclerosis of the ulnar and median nerve was detected. *Bacillus leprae* was found. The patient was treated with chaulmoogra oil, and some improvement took place. The oil, however, appeared to cause abdominal pain and vomiting, and was discontinued in September.

The second patient was a male, aged 33 years, a native of Surrey, England, who came to Queensland in 1894, and had resided continuously at Rockhampton. He had had dengue fever in 1902. In 1910 he observed a rash on the chest, and 18 months later an ulcer on the sole of the right foot. There was infiltration and nodule formation of the skin, some involvement of the ulnar nerve and of the external popliteal nerves. The ulcer on the ball of the foot led to dead bone. Later the second toe of the right foot became gangrenous, and had to be amputated. This patient was also treated by chaulmoogra oil.

The third patient was a native of New South Wales, and was 15 years of age. He had lived the whole of his life in the Lismore district. Early in 1913 blisters appeared spontaneously over the left patella. In 1914 a general eruption appeared. He presented all the usual signs of tuberous leprosy, and *bacilli leprae* were found in the lymph taken from the right ear lobe and left eyebrow and in both nares. Chaulmoogra oil was given throughout the year.

The fourth patient was a native of Banks Island, New Hebrides, and was 50 years of age. He came to Brisbane in 1879, and moved to Sydney in 1892. In 1900 he went to Tweed River. Nodules developed in the skin of the face in August, 1914, and at the same time he complained of weakness of the hands. Epistaxis and nasal obstruction occurred later. The disease was well marked, and involved the skin of the head, trunk, upper and lower limbs, the ulnar and external popliteal nerves and the inguinal lymphatic glands. There was no bacteriological confirmation of the diagnosis.

The history of the case of the man who died is also given. He was a Kanaka, and was born in 1867. He was admitted into the Lazaret in 1903 with well-marked tuberous leprosy. In February, 1914, the first two phalanges of the second toe of the right foot were amputated on account of necrosis. He had suffered from diarrhœa for some months, and in March had lost a considerable amount of weight. He died on March 14. A full account of the macroscopical and microscopical appearances of the affected tissues is published.

From the progress reports it appears that chaulmoogra oil was used during the year in the treatment of 12 out of 18 patients. In some cases distinct improvement was noticed. Two of the patients received gynocardate of magnesium, but in neither case was any noticeable change effected by the treatment.

Since the establishment of the Lazaret in 1883, 134 patients have been dealt with. There were 36 Australians, one New Zealander, nine English patients, five from Ireland and two from Fiji, making 53 British subjects in all; four persons from the continent of Europe, and one from the United States of America. The remaining 76 patients were coloured. Of the 134 60 died, one absconded, 11 were discharged, 39 were repatriated, and 24 were still under treatment at the end of the year under review.

(To be continued.)

Special Correspondence.

(By Our Special Correspondent.)

LONDON LETTER.

The Physical Education of Children.

The annual report of Sir George Newman, Chief Medical Officer of the Board of Education, was issued on September 13, 1916. The scope of the school medical service towards the 6,000,000 children in the elementary schools of England and Wales involves three great aims: to discover by medical inspection children who are unfit and to remedy, as far as is possible, their disabilities; to provide healthy conditions of life for children who are normally well; and to establish, on a national foundation, suitable provisions for physical education. Sir George Newman states that, in spite of the war, there has been a substantial increase in the medical treatment of elementary school children. Many new clinics have been established, particularly for dental treatment. The fact remains, however, that probably not much more than one-half of the total defects revealed by medical in-

spection are receiving treatment, and whilst about 280 authorities out of 317 have made some arrangements for facilitating treatment in some form, more than half the total number of authorities have done nothing in respect of dental treatment, only 93 authorities have made provision for dealing with enlarged tonsils and adenoids, and only 71 have provided X-ray treatment for ringworm.

The physical education of all the children in the realm is now a matter of pressing importance. The medical and surgical treatment of the sick or defective child is essential, but that cannot take the place of the much larger branch of school hygiene comprised in securing for all children an adequate up-bringing, based upon a sufficiency of food, air and exercise.

Sir George Newman insists upon the necessity of providing a system of medical treatment, in addition to the plan of medical inspection. He says. "The State cannot afford to leave this matter to chance, for the simple reason that the result would be, as it has been in the past, that the defective child would not, as a rule, receive treatment. Now there are two practical reasons for this. First, the child does not obtain treatment in the absence of means of treatment; and, secondly, the child does not obtain treatment if there are difficulties of approach, even when the means exist. About this there is no manner of doubt. Experience has proved it. Nor is there any doubt as to the solution of the problem. It is the provision of adequate and available means of treatment and the removal of deterrents to its acceptance."

There is a very large number of children of school age who, on account of physical or mental defects, many of them curable, are prevented from obtaining adequate benefit from a State-provided education. Whatever plan of management may be required to deal with such a serious national wastage deserves to be adopted without delay.

The Chemistry of Dyestuffs.

The Faculty of Technology in the University of Manchester has invited Professor Arthur G. Green to take charge of a new department for advanced study and research in the subject of coal tar chemistry in the School of Technology. This department will be open only to post-graduate students, or to those of equivalent attainments, whether trained in Manchester University or in other chemical schools of the country. The realization of this scheme has been greatly assisted by the support rendered by the Privy Council Committee for Industrial Research. Among those who will assist Professor Green with the Research Department are Mr. F. M. Rowe, formerly one of his research assistants at Leeds, who has since studied under Freundlich, at Brunswick; and Dr. G. Grant Hepburn, who was for some time research assistant to Noelting at Mülhausen and was afterwards chief chemist to a dyeing and calico printing works in Russia. Mr. Rowe obtained his M.Sc. degree by research on colouring matters at Leeds, and has recently been appointed Lecturer on Dyestuffs in the University of Manchester. Dr. Hepburn obtained his Doctor's degree for chemical research in the University of Basle. This pioneer staff will further have the valuable help and advice of Dr. Edmund Knecht, the Professor of Chemical Technology, who is well known as an expert in dyeing chemistry, on which he has published many researches. It is confidently anticipated that the new department, with its strong teaching and research staff, will not only occupy the position of an important training centre for the young chemist required by our growing organic chemical industries, but will at the same time become a central research station for the chemistry of dyestuffs and allied branches of applied chemistry.

Obituary.

ROGER FORREST HUGHES.

As announced in our issue of December 23, 1916, Captain Roger Forrest Hughes, A.A.M.C., was killed in action in France on December 12, 1916.

Roger Forrest Hughes was born in 1890. He was the eldest son of Sir Thomas Hughes, M.L.C., of Sydney, and the nephew of the late Honourable John Hughes, M.L.C. He was educated at St. Ignatius' College, Riverview, Sydney, where he had a distinguished career, winning two medals in the University junior examinations. After leaving school he entered the Sydney University and took an Arts degree before proceeding with his medical studies. He graduated in medicine in 1915, securing the degrees of M.B., Ch.M. While an undergraduate he took a prominent part in all forms of sport, and was chosen by his comrades as Honorary Secretary of the University Union. Shortly after passing out of the University he was appointed to a position on the resident staff of St. Vincent's Hospital in Sydney, where he won golden opinions by his devotion to duty.

Feeling, as a loyal Australian, that it was an obligation to do his best for the Empire, he joined the Australian Army Medical Corps and was detailed for duty at the Liverpool and other camps. Later he was appointed Resident Medical Officer at the No. 4 Australian General Hospital, Randwick. His attainments and genial disposition caused him to become a general favourite. He never spared himself when work was to be done, and his high moral character was appreciated by all with whom he came into contact. From Randwick he went to England, and subsequently to France, where his death occurred.

Shortly before he left Sydney he married Miss Eileen Maher, the sister of Dr. Weston Maher, of Sydney, and niece of the late Dr. Odillo Maher.

A requiem mass was celebrated at St. Mary's Cathedral on December 18, 1916, at which Archbishop Kelly presided, and spoke feelingly of the death of this brave young Australian officer. The Cathedral was filled by those who knew and admired our colleague who had sacrificed his life for his country. To his young widow and to his parents our hearts go out in their grief at the loss of so estimable a member of the community.

Roger Forrest Hughes's younger brother, Geoffrey, is a Flight-Lieutenant in the Royal Flying Corps in France.

GEORGE ARCHIBALD MARSHALL.

The war has robbed the medical profession of another of its members, whose utility to the community raised the value of his life well above the average. The ralatives, friends and patients of George Archibald Marshall have suffered a loss which cannot easily be made good.

George Archibald Marshall was born in Raphoe, County Tyrone, Ireland, 58 years ago. His father was a medical practitioner in that town. He was educated at the Royal School at Raphoe, where he showed at an early age a predilection for classical study. He obtained a classical fellowship at school, and had but little difficulty in out-pacing his comrades in Latin and Greek learning. In 1876 he matriculated and became an under-graduate at Trinity College, Dublin. While preparing for his Arts degree, he gained an Exhibition in classics. In 1882 he graduated in Medicine, having passed his examinations for the M.B. and B.Ch. Immediately after qualifying he migrated to Australia, and became the assistant of his uncle, the late Dr. George Marshall, who was a well-known surgeon in Sydney. After a short period of apprenticeship he started practice by himself, and in the course of the years that followed he built up an extensive and valuable practice, and earned the reputation of a careful, skilled and sympathetic practitioner of medicine.

In 1892 he joined the Australian Army Medical Corps with the rank of second lieutenant. He was promoted to first lieutenant in the same year, and obtained his captaincy three years later. He served with the "A" Battery during the South African campaign and saw active service in the Transvaal and Orange River Colony during the period between November 30, 1900, and May 31, 1902. His thoroughness, courage, and high sense of duty met with recognition. He was decorated with the Queen's Medal with clasps before leaving South Africa. He gained his majority in 1903, and was promoted to the rank of lieutenant-colonel in 1909.

At the outbreak of war in 1914 he was again detailed for duty, and left Australia with the Headquarters Staff of the First Expeditionary Force as Deputy Assistant Director of Medical Service. Ten days after landing at Gallipoli he was wounded, and in the course of time he was sent to

England. He then returned to Sydney and received his discharge as medically unfit for further active service. He succumbed to the effects of his wounds on December 23, 1916.

George Archibald Marshall was a man of few words and of a reserved disposition. A short acquaintance, however, sufficed to reveal the real nature of the man and the best testimony of his sterling qualities is to be found in the fact that while the number of his friends increased steadily, he made no enemies. He remained a student and delighted in pursuing his classical studies when others would have sought different forms of recreation. His patients, like his friends, loved him and set a very high price on his services. He had two brothers in the medical profession, one of whom, Dr. J. Marshall, is in practice in Bega, New South Wales.

Correspondence.

PRACTICE BY PHARMACISTS.

Sir,—I notice in the daily press that a Government movement is on foot to suppress unqualified practice, or, as one paper puts it, "to register herbalists"; of course, the latter would merely be a jump from the frying-pan into the proverbial fire so far as the medical profession is concerned, and should be bitterly opposed. Where I am practising there are five or six pharmacists, four being "consulting chemists," three of whom have surgeries for consultation and examination of patients. After the patient had been treated for two or three weeks without a cure, or gets rapidly in a moribund condition, I then get him or her, and am expected to diagnose the case, give a prescription, from which the "consulting" chemist "rediagnoses" the case and continues the treatment. If the case is hopeless I am expected to examine the patient and give the necessary death certificate. This, I may say, is the ordinary condition of practice throughout Sydney, and the "consulting" chemists are getting bolder and bolder. This week one operated on a child with very nearly fatal results; he took no blame, as he told the mother the child's blood was out of order, and that was the cause of all the trouble. As for venereal cases, I never see them more than once or twice, as the chemist always has a "better mixture" than mine and a very small consultation fee, and, of course, in working suburbs, this kind of bait invariably takes, especially if carefully and nicely put, as one woman this week said, "Mr. So-and-So is such a nice man, and he examines (*p.v.*) you so carefully!!" No one objects to a chemist selling a bottle of cough mixture, but when it comes to practising as a physician-surgeon-chemist, well! a line must be drawn somewhere.

Yours, etc.,

M.D.

Sydney, December 23, 1916.

Medical Appointments.

IMPORTANT NOTICE.

Medical practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429 Strand, London, W.C.

Branch.	APPOINTMENTS.
VICTORIA. (Hon. Sec., Medical Society Hall, East Melbourne.)	Brunswick Medical Institute. Bendigo Medical Institute. Prahran United F.S. Dispensary. Australian Prudential Association Proprietary, Limited. National Provident Association. Life Insurance Company of Australia, Limited. Mutual National Provident Club.
SOUTH AUSTRALIA. (Hon. Sec., 3 North Terrace, Adelaide.)	The F.S. Medical Assoc., Incorp., Adelaide.
QUEENSLAND. (Hon. Sec., B.M.A. Building, Adelaide Street, Brisbane.)	Brisbane United F.S. Institute.
WESTERN AUSTRALIA. (Hon. Sec., 220 St. George's Terrace, Perth.)	Swan District Medical Officer. All Contract Practice Appointments in Western Australia.
NEW SOUTH WALES. (Hon. Sec., 30-34 Elizabeth Street, Sydney.)	Department of Public Instruction—Appointments as Salaried Medical Officers, with duties which include the treatment of school children. Australian Natives' Association. Balmain United F.S. Dispensary. Canterbury United F.S. Dispensary. Leichhardt and Petersham Dispensary. M.U. Oddfellows' Med. Inst., Elizabeth Street, Sydney. Marrickville United F.S. Dispensary. N.S.W. Ambulance Association and Transport Brigade. North Sydney United F.S. People's Prudential Benefit Society. Phœnix Mutual Provident Society. F.S. Lodges at Casino. F.S. Lodges at Lithgow. F.S. Lodges at Orange. F.S. Lodges at Parramatta, Penrith, Auburn, and Lidcombe. Newcastle Collieries — Killingworth, Seaham Nos. 1 and 2, West Wallsend.
NEW ZEALAND: WELLINGTON DIVISION. (Hon. Sec., Wellington.)	F.S. Lodges, Wellington, N.Z.

Diary for the Month.

Jan. 9.—N.S.W. Branch, B.M.A., Council (Quarterly).
Jan. 16.—N.S.W. Branch, B.M.A., Executive and Finance Committee.
Jan. 18.—Vic. Branch, B.M.A., Council.
Jan. 19.—Queensland Branch, B.M.A., Council.
Jan. 23.—N.S.W. Branch, B.M.A., Ethics Committee.
Jan. 30.—N.S.W. Branch, B.M.A., Medical Politics Committee; Organization and Science Committee.
Jan. 31.—Vic. Branch, B.M.A., Council.
Feb. 7.—Victorian Branch B.M.A., Branch Meeting.

EDITORIAL NOTICES.

Manuscripts forwarded to the office of this Journal cannot under any circumstances be returned.

Original articles forwarded for publication are understood to be offered to *The Medical Journal of Australia* alone, unless the contrary be stated.

All communications should be addressed to "The Editor," *The Medical Journal of Australia*, B.M.A. Building, 30-34 Elizabeth Street, Sydney, New South Wales.